

EARNED VALUE MANAGEMENT SYSTEM INTERPRETATION HANDBOOK (EVMSIH)



**Office of Project Management
Oversight and Assessments (PMOA)
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FOREWORD

Earned Value Management (EVM) is one of DOE's and industry's most powerful project management tools. Government and industry project managers use EVM to assess cost, schedule and technical progress on projects. A key aspect is the ability to capture physical technical progress versus the planned schedule and cost as an early warning indicator of performance. This supports proactive decision-making as they navigate the day-to-day constraints and risks that are inherent in all DOE capital asset projects.

With respect to use of EVM on capital asset projects subject to DOE Order 413.3, the Office of Project Management Oversight and Assessments (PMOA) is the prime authority for EVM policy, oversight, and governance across the DOE. To be effective, EVM practices and competencies must be integrated into the project manager's acquisition decision-making process; the data provided by the EVM System (EVMS) must be timely, accurate, reliable and auditable; and the EVMS must be implemented in a disciplined manner consistent with the 32 Guidelines contained in the Electronic Industries Alliance Standard-748 EVMS (EIA-748) (see App. C - References).

The DOE EVMS Interpretation Handbook EVMSIH is the basis for defining and assessing EVMS compliance to the EIA-748 Guidelines. It was developed in collaboration with DOE and contractor EVMS experts, and based extensively on the complete EVM historical body of knowledge documents from industry and various Government organizations as well as DOE unique situations/conditions. The DOE EVMSIH consolidates the necessary elements from existing EVM body of knowledge documents into a single source for EVM interpretation within DOE to ensure consistency of expectations, implementation, and assessment.

The following strategies support the intended uses of the document:

- 1) Standardization of the expectations of an EVM compliant system
- 2) Standardization of the EVM compliance and surveillance review assessment process
- 3) Serve as a benchmark for contractor System Descriptions
- 4) Serve as the foundation for effective contractor self-certification and internal surveillances
- 5) Serve as an effective baseline to measure corrective action
- 6) Serve as a training tool for both the DOE Federal staff and DOE capital asset contractors

INTRODUCTION

1.1 Purpose of EVMSIH

Earned Value Management (EVM) is a widely accepted industry best practice for project and project management that is used across DOE, the Department of Defense (DoD), the Civilian Federal Agencies, and the commercial sector. Government and industry project managers use EVM as a project management tool to provide project status and to assess the cost, schedule, and technical performance of projects for proactive course correction. An EVMS is the management control system that integrates a project's work scope, schedule, and cost parameters supporting effective project planning and control. To be useful as a project management tool, project managers must incorporate EVM into their acquisition decision-making processes; the EVM performance data generated by the EVMS must be timely, accurate, reliable, and auditable; and the EVMS must be implemented in a disciplined manner consistent with the 32 EVMS Guidelines prescribed in Section 2 of the Electronic Industries Alliance Standard-748 EVMS (EIA-748) (see App. C - References) hereafter referred to as "the 32 Guidelines."

The DOE EVMSIH provides the overarching DOE interpretation of the 32 Guidelines where an EVMS requirement is applied. It serves as the authoritative source for EVMS interpretive guidance and is used as the basis for the DOE to assess EVMS compliance to the 32 Guidelines in accordance with DOE O 413.3 and contractual requirements to implement an EVMS. The EVMSIH provides the DOE strategic intent behind each guideline in a qualifying expectation line of inquiry (QE LOI) format. Those QE LOIs are the general qualities of effective implementation that are tested in support of determining EVMS compliance.

In summary, the EVMSIH is unique in that it addresses the qualifying expectations, the meaning behind the QE LOIs, and how each is verified. This provides an open book EVM review process that is less people dependent and more process dependent, providing a consistent and repeatable approach.

1.2 EVM Policy

The Office of Management and Budget Circular No. A-11 along with its supplemental Capital Programming Guide, and the Federal Acquisition Regulation (FAR) Subparts 34.2 and 52 (see App. C - References) require federal government agencies to require, maintain, and use an EVMS that is compliant with the 32 Guidelines of EIA-748 on all major capital asset acquisitions. DOE Order 413.3 implements these EVM requirements on non-fixed price projects with a Total Project Cost (TPC) greater than \$20M.

1.3 EVMS Compliance

A properly implemented EVMS provides internal controls and formal project management processes for managing any acquisition within the DOE. These controls and processes ensure both contractor and government project managers, as well as other government stakeholders, receive contract performance data that:

- Relates time-phased budgets to corresponding scope of work;
- Objectively measures work progress;
- Reflects achievement of project objectives within budget, on schedule, and within technical performance parameters;
- Allows for informed decisions and corrective action;
- Is timely, accurate, reliable, and auditable;
- Allows for estimation of future costs;
- Supplies managers at all levels with appropriate project status information; and
- Is derived from the same EVMS the contractor uses to manage the project in accordance with their contract.

The routine use of generally accepted management best practices and typical business management systems should already be firmly embedded into the contractor's culture and business processes.

The DOE requires the management system and processes (i.e., tools, techniques and procedures) used by the contractor's project management staff to be formally documented in either a stand-alone EVM System Description (EVM SD) or in a set or series of integrated process descriptions/procedures that describe the contractor's approach to a compliant EVMS. This documentation describes how the contractor's business processes and associated data/work products meet the intentions of the 32 Guidelines by each QE LOI. The work products identified in the EVMSIH summarize the type of documentation or system inputs/outputs needed for, or resulting from, the integration of subsystems and processes that a contractor may use to effectively manage its projects.

As part of compliance assessments, contractors are expected to both explain and demonstrate how the integrated parts of the EVMS are used to comply with the 32 Guidelines. There are three steps for evaluating compliance: (1) assess whether the contractor's EVM SD adequately documents how its system meets the intent of the 32 Guidelines, (2) evaluate the contractor's ability to demonstrate the EVMS implementation as described in the SD and supplemental procedures, and (3) ensure the EVMS is providing timely, accurate, reliable and auditable data. Compliance is determined based upon the results of all three steps.

Contractors are required to demonstrate compliance with the 32 Guidelines regardless of EVM reporting requirements defined in the contract. The flow down of an EVMS requirement to a subcontractor requires special consideration to ensure subcontractor compliance with the 32 Guidelines and for the prime contractor to incorporate subcontractor EVMS data into its EVMS. It is incumbent upon the prime contractor to develop and demonstrate an effective methodology for managing the

integration of its subcontractors into their EVMS. At all times the prime retains complete responsibility for the EVM reporting on the full project.

1.4 Content and Format of the EVMSIH

The EVMSIH contains seven sections with four appendixes. Section 1.0, the Introduction, provides the purpose of the Handbook, an overview of EVM policy, a brief description of EVMS compliance assessments, and a synopsis of the overall content and format of the Handbook.

Sections 2.0 through 7.0 contain the 32 Guidelines (GL) in six categories, with the indirect group of guidelines discussed together in Section 7:

Section 2.0 Organization – Guidelines 1 through 5

Section 3.0 Planning, Scheduling, and Budgeting – Guidelines 6 through 15

Section 4.0 Accounting Considerations – Guidelines 16 through 21

Section 5.0 Analysis and Management Reporting – Guidelines 22 through 27

Section 6.0 Revisions and Data Maintenance – Guidelines 28 through 32

Section 7.0 Indirect – Guidelines 4, 13, 19, and 24

These sections provide the guideline interpretations. Each section describes the applicable QE LOI, the narrative explanation, the impact, and suggested Verification Steps. The verifications steps are broken into three parts:

- Data Analysis – metrics or formulas that are automatable
- Artifact Traces – manual comparison and review between artifacts
- Interview Questions – asked of Control Account Managers (CAMs), Project Controls Staff, and/or Management team

Each QE LOI has one or more Verification Steps. In general the format of each QE LOI section is shown below:

28.A.2 QE LOI – Minimum Expectations. The expectations of each guideline support how the guideline is interpreted for compliance.

Narrative. This section explains the QE LOI and provides illustrations or examples to clarify the requirement.

Impact of Noncompliance. This is the failure that occurs with non-compliance.

Verification Steps

Data Analysis (Automatable)

Traces based on schedule or cost imports that can be automated. Not every QE LOI is automatable. This section does not have all the exclusions listed. The intent is after the automated tools are tested they will have the complete automated formulas and be available as the source document.

Artifact Traces between documents

This compares two or more different documents to verify compliance.

Interview Questions

These are the minimal questions that must be asked to verify the QE LOI has been satisfied. For an actual review, they are supplemented by data analysis results to define the questions and approach for an individual surveillance or compliance review.

Production or manufacture type projects are characterized by multiple similar products produced over time. Typically because of complex just in time management aspects, they may be managed with a more formal Material Requirements/Manufacturing/Enterprise Resource Planning (M/ERP) system. The unique aspect of these type environments with earned value is discussed in Appendix D which supplements sections 2-7 discussions.

1.4.1 Approach to Acronyms, Abbreviations, Definitions and References

There are many common acronyms in earned value that are used in this document. Appendix A - Glossary contains acronyms and abbreviations. Appendix B – Definitions and Sources, contains the definitions for all of the acronyms and abbreviations as well as a source reference for each acronym. Appendix C – References, contains documents referenced in the EVMSIH.

1.4.2 Approach to Terminology.

This document uses standard terminology defined in the Glossary. Contractors may use different terms. For example, the data Dictionary may be titled Schedule Nomenclature. Compliance is demonstrated by meeting QE LOI and data trace intent and not necessarily the specific terminology of an artifact or tool used.

a. This document frequently uses the term days. Unless otherwise specified, the default is working days as identified by the contractor's accounting calendar.

b. Within this document the terms must, shall, should, may and recommended are defined as follows:

- Must or shall: used to indicate an absolute requirement.
- Should: used to indicate an attribute or objective which must be addressed but not specifically as stated; the full implications must be understood and carefully weighed before choosing a different approach.
- May or recommended: used to indicate a recommended but discretionary approach based on established good practices.

Unless otherwise specified, the intended timeframe over which automated tests or traces are conducted to demonstrate compliance is a period of three months. This means that until a test can be repeated over a consecutive three month period with acceptable results, the system has not been demonstrated to show systematic and sustained compliance with the intent of the QE LOI.

1.5 General Topics to Understand Guideline Intent

1.5.1 Overall Compliance.

Traditionally, compliance with the EVMS standard is somewhat based on how many guidelines are non-compliant. Defining QE LOIs below the guideline may raise a concern of lower checkpoints and increased opportunities for non-compliance. There is no expectation that one QE LOI will cause the contractor to be non-compliant overall and lose an EVMS certification. It is expected, however, that every QE LOI not met may result in a Corrective Action Request (CAR) requiring contractor action. Additionally test results may be summarized into a single CAR by related issues as warranted. The number of non-compliant guidelines and QE LOIs that would equate to a determination of overall non-compliance and potential loss of system certification depends on many factors. There are CARs that have a significant impact on data accuracy, are pervasive, and may require months to fix while other CARs may have a minor impact, are limited, and can be fixed within the review. Compliance assessment has always been and will continue to be a judgement call based on the reliability of the overall system to produce accurate and timely data, as well as useful information to effectively manage the project including scheduling, work authorization, budgeting, assessment, analysis, corrective actions, and change control practices employed by the contractor.

1.5.2 Project versus Program.

DOE O 413.3 requires capital asset projects over \$20M to implement an effective EVMS. Some sites have a contract requirement above the project level known as the program level. Note: The DOE O 413.3 requirement in this context of project is at the total federal cost level or total project cost (TPC). EVM Certification and Surveillance reviews are against the capital asset projects required by DOE O 413.3. For capital asset projects under an umbrella EVMS contract requirement at the program level (e.g., an M&O

contract or EM Cleanup contract), it is incumbent on the contractor to define or be able to produce for each capital asset project:

- 1) A unique WBS and OBS with RAM for the capital asset project(s)
- 2) A unique IMS
- 3) A unique EVM Cost Tool equivalent
- 4) Unique variance analysis and revision control
- 5) Able to produce a project unique IPMR/CPR as required
- 6) Be able to demonstrate compliance with the standard in all aspects at the capital asset level for all projects at that site consistent with DOE O 413.3
- 7) Be able to respond to EVMS review “data calls” with project unique information

SECTION 2.0 ORGANIZATION (GUIDELINES 1-5)

The Organization category focuses on the fundamental preparations for executing the project technical objectives to ensure effective management control of the project. The primary objectives of the five guidelines (1 – 5) that comprise this category are to establish the basic framework for capturing all contractually authorized work to be accomplished, identify the functional organization hierarchy responsible for accomplishing that work, and create an integrated structure that allows for management control of all effort.

A structured approach for decomposing the project work into manageable segments creates the Work Breakdown Structure (WBS) wherein each WBS element contains a specific scope of work. The work is defined in the WBS Dictionary and includes a description of the technical and cost content for each element. The WBS also provides the basic structure for planning, budgeting, scheduling, cost accounting, work authorization, measuring progress, data collection, reporting project status and management control (Guideline 1). The establishment of an organizational structure (i.e., Organization Breakdown Structure (OBS)) is to assign organizational responsibility, accountability, and authority for all the project work. It identifies which managers in the corporate structure, to include major subcontractors, have responsibility for work accomplishment (Guideline 2).

The Organization guidelines require the use of a fully integrated management system to execute the project. The planning, scheduling, budgeting, work authorization, and cost accumulation management subsystems must integrate in the EVMS such that the data derived from one system is relatable to and consistent with the data of each of the other systems. The integration provides the capability for establishing the Performance Measurement Baseline (PMB), identifying work progress, and collecting actual costs, facilitating management analysis and corrective actions. The proper integration of the contractor's business systems and EVMS subsystems ensures the information and performance data retrieved from the EVMS is timely, accurate, reliable, and auditable (Guideline 3). In addition, the guidelines require the contractor to identify and document who within the company hierarchy is responsible for establishing controlling, and managing indirect budgets (e.g., overhead, General & Administrative, and Cost of Money) (Guideline 4).

The assignment of organizational elements to specific WBS elements establishes the control accounts (CAs), which are the primary management control point for work authorization, budgeting, cost accumulation and performance measurement (Guideline 5). Through creating CAs, the project manager communicates who (i.e., the Control Account Manager (CAM)) in the organization is given authority and responsibility to manage, control, and facilitate the allocation of resources to accomplish a specific scope of work. The CAM is ultimately responsible for the cost, schedule, and technical performance associated with accomplishing the scope of work within a control account. The CAM is also responsible for planning the resources necessary to accomplish that scope of work. In some cases, particularly in a production environment, other functional organizations (e.g., Planning, Business Operations, etc.) may assume a more active role in the planning and management of resources in support of the CAM's responsibilities. In this scenario, effective internal bilateral communication between the CAM and the functional

organizations is essential to ensure accomplishment of the CAM's responsibility for managing the execution of the CA scope of work.

DOE's interpretation of EIA-748 Guidelines Subsections 1-3 and 5 are contained below. Guideline 4, covering indirect, is covered in summary with the details in Section 7.0 Indirect Guidelines (Guidelines 4, 13, 19, 24).

Guideline 1 – Define the WBS

Define the authorized work elements for the project. A work breakdown structure (WBS), tailored for effective internal management control, is commonly used in this process.

The guideline is further defined by Qualifying Expectations Lines of Inquiry shown below.

QE LOI Guideline 1

1.A.1	Is a single product-oriented WBS used for a given project extended to the control account level as a minimum?
1.A.2	Does the WBS include all project work including the work scope to be performed by subcontractors and any revisions resulting from authorized changes and modifications?
1.A.3	Does the WBS roll up hierarchically from the lowest level to the project level?
1.A.4	Is the definition of the project work scope in the WBS Dictionary (or other contractor document) consistent through the most recent project authorization document?
1.A.5	Are all project required deliverables included in the WBS as applicable?
1.A.6	Is the current WBS reconcilable to the original project WBS throughout the incorporation of the relevant change documents?

QE LOIs Repeated With Discussions

1.A.1 Is a single product-oriented WBS used for a given project extended to the control account level as a minimum?

Discussion

The key aspect of this QE LOI is a single, product/deliverable-oriented WBS extended to the CA level at a minimum (see guideline 8). In all cases, the contractor must extend the WBS to a level needed for effective internal management control. This should not be an arbitrary level established across the project. The WBS is a direct representation of the work scope of each specific project which documents the hierarchy and description of the activities to be performed and their relationship to the project deliverables. The WBS

is used as a nomenclature that demonstrates integration of the scope, schedule, and budget systems of the project. Therefore, only one WBS is logical and acceptable. The WBS represents the complete project scope. This QE LOI focuses on the WBS extended down to the CA level as a minimum requirement since the CA is where project work scope, schedule, and budget requirements are integrated, planned, and managed. Guideline 10 requires each work package (WP) to have scope; therefore the WBS may logically extend to the WP level for effective internal management control. This ensures WPs roll up to CAs and CAs roll up to the total project (see guidelines 11, 15, and 17 for roll-up requirements).

There may be circumstances which would have the WBS reflecting non-contractor responsibility scope such as contingency, work for other sites, and DOE directed non-project efforts. In these cases, the non-project/non-contract specific scope must be clearly identified and segregated within the WBS. Typically if necessary this is accomplished in a level 2 leg of the WBS for clarity. The intent is that non-project/non-contract scope, if any, must not be co-mingled with project scope to distort WBS and OBS rollup. In addition, typically, earned value is not expected on non-project/non-contract scope. Therefore this work should not be combined with other project work and broken out separately at the highest WBS levels.

Impact of Noncompliance

Without a single WBS that contains all authorized project work, the project cannot be properly planned, managed, and executed.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the WBS and verify only one WBS structure is used for the project.
 - a. Compare the WBS Index to the WBS structure in the RAM, WADs, IMS, EVM Cost Tool, Control Account Plan (CAP), and the IPMR/CPR Format 1 and verify the WBS structure is consistent through the system.
 - b. Identify any WBS elements that are not part of the project scope. If present, these WBS elements should not be considered for purposes of this LOI.
 - c. Using the previous trace artifacts, verify the WBS is extended to the control account level at a minimum.
 - d. Document all discrepancies as compliance concerns
2. Verify the WBS is a product oriented WBS consistent with the DOE PMOA Work Breakdown Structure (WBS) Handbook.
 - a. Compare the WBS Dictionary structure with the DOE PMOA WBS Handbook guidance.

- b. Trace all levels of the current WBS.
- c. Identify any WBS elements that are not part of the project scope. If present, these WBS elements should be clearly identified but not considered for purposes of this LOI.
- d. Document all discrepancies as compliance concerns

Interview Questions

None

1.A.2 Does the WBS include all authorized project work including the identification of work scope to be performed by subcontractors and any revisions resulting from authorized changes and modifications?

Discussion

One of the functions of the WBS is integration of work scope to ensure all of the project scope is performed and to limit out-of-scope work from being performed. The complete and proper identification of all contractually authorized work to be accomplished on a project helps ensure resources are correctly identified and work is planned within the authorized project schedule. A well-developed WBS provides the project manager with a framework that represents all contract work scope and facilitates correlation between the contract scope (e.g., Statement of Work, Design Build Specifications, etc.) and technical criteria.

The WBS must therefore be linked with scope so that 100% of the project requirements are contained within the WBS structure. It must also contain all project elements (e.g., hardware, software, services, data, or facilities) and is decomposed to lower levels for planning, budgeting, scheduling, cost accounting, work authorization, measuring progress, and management control purposes. The WBS is structured to best manage and report on project performance.

DOE scope is typically high level and the contractor breaks this down to manageable pieces to define CAs. Linkage to the WBS ensures that all work is authorized by the project and as a guard to prohibit unauthorized work from being performed. Any scope subcontracted, regardless of size of the scope, must be included within the WBS.

Impact of Noncompliance

Failure to link scope with the WBS may result in required work being omitted or unauthorized work being performed.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Verify the WBS Dictionary includes the complete scope of work.
 - a. Compare the current WBS Dictionary to the current Project Execution Plan (PEP)/Statement of Work (SOW) for completeness.
 - b. Trace all WBS elements to ensure that every current DOE requirement is represented in the WBS Dictionary.
 - c. Document all discrepancies as compliance concerns.
2. Verify all WBS elements are covered and the WBS Dictionary defines the scope to the control account level, at a minimum.
 - a. Compare the current WBS Dictionary WBS to the CAPs (CAPs) or place where WP/planning package (PP) scope is defined.
 - b. Note: if scope in the WBS Dictionary is to the WP and planning package level this trace can be accomplished with only the WBS Dictionary.
 - c. Trace all elements to ensure all WBS elements are appropriately covered and that scope is defined to the WP/PP level.
 - d. Document all discrepancies as compliance concerns
3. Verify all significant subcontracted elements are identified in the WBS.
 - a. Obtain the contractor list of major subcontractors and compare the list to the WBS elements to ensure all are identified in the WBS.
 - b. Trace the subcontract SOW to the WBS Dictionary and verify consistency.
 - c. Trace all major subcontractors.
 - d. Document all discrepancies as compliance concerns.
3. Verify CA scope is consistent with the WBS Dictionary.
 - a. Select 5 discrete CAs and 2 LOE CAs.
 - b. Trace the CA scope with the WBS Dictionary element it is associated with.
 1. If the WBS Dictionary is at the WP level this check would be at a summary WBS Dictionary level.
 2. If the WBS Dictionary is at the CA level then this check is one for one.
 - c. Document all discrepancies as compliance concerns

Interview Questions

1. (CAM) – Please demonstrate how the WBS you use is consistent with the WBS Dictionary?

1.A.3 Does the WBS roll up hierarchically from the lowest level to the project level?

Discussion

The WBS is intended to be a logical parent-child structure. This simply means a logical structure that has meaning at every level. The lowest level could be the WP/PP level within the control account as defined by QE LOI 1.a.1. The WBS is required to extend down to the CA level as a minimum.

There is no requirement that WBS's have a decimal point/dot or period (".") between levels. Some EVM Cost Tools require this and others do not. Rollup is typically proven through the levels of the WBS structure. The WBS coding structure can be all alpha, all numeric, or a combination if logical. Figure 1 below illustrates a logical parent-child structure.

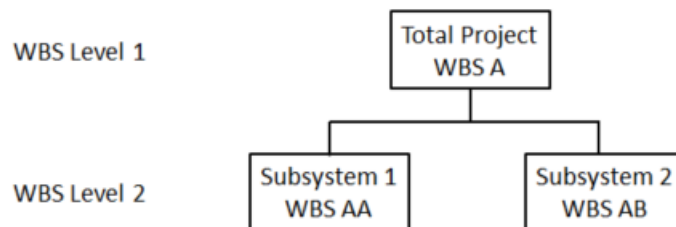


Figure 1 – WBS Example

There is no requirement that charge numbers reflect the WBS structure. Charge number formats are typically fixed by the accounting system tools or rules and may not be able to accommodate a WBS structure. Instead, the alternate structure of the charge number is mapped to the WP or CA (see guideline 16)

Impact of Noncompliance

Failure for the WBS to roll up hierarchically from the lowest level to the project level negates the project's ability to ensure the entire scope of work is captured, defined, and allocated to organizations that will be responsible for the performance of work?

Verification Steps

Data Analysis (Automatable)

None

Artifact Trace between documents

1. Compare the internal WBS Dictionary to the WBS elements in IPMR/CPR Format 1 to determine if the WBS includes all levels specified in the contractual reporting requirements.
 - a. $X = \# \text{ of WBS elements in IPMR/CPR Format 1 not included in the WBS} / Y = \text{total \# of WBS elements in IPMR/CPR Format 1.}$
 - b. WBS elements identified in LOI 1.A.1 that are not part of the project scope should not be considered for purposes of this LOI.
 - c. Document all discrepancies as compliance concerns.

2. Compare the WBS rollup to the project level
 - a. Obtain an IPMR/CPR Format 1 report at the CA or WP level. If this is below the established IPMR/CPR reporting level, request a special report be produced by the contractor
 - b. Verify the WBS is logical at each level. Are there logical rollups? Compare with the WBS Dictionary.
 - c. Document all discrepancies as compliance concerns.

Interview Questions

None

1.A.4 Is the definition of the project work scope in the WBS Dictionary (or other contractor document) consistent through the most recent project authorization document?

Discussion

The WBS is a product-oriented, hierarchical reporting structure. It represents the entire project scope and is integrated through work authorization at the CA level or the WBS Dictionary extended to the same level. Wherever the scope is integrated with the WBS (Dictionary or work authorization), it must be updated to reflect the scope that was changed at the same level.

Note, each level of the WBS must be explained in the Dictionary or equivalent.

Impact of Noncompliance

Lack of current scope definition invalidates the usefulness of the WBS.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Verify contractors SOW is consistent with the PEP.
 - a. Review project modifications/change documentation (if applicable) and compare to PEP/project (SOW) to ensure SOW is current.
 - b. Use project modifications within the last 6 months from the current reporting period.
 - c. Document all discrepancies as compliance concerns.
2. Verify the WBS Dictionary paragraphs include all of the current work scope
 - a. Compare the WBS Dictionary to the project SOW paragraphs for completeness.
 - b. Document all discrepancies as compliance concerns.
3. Verify all subcontracted scope is identified in the WBS.
 - a. Obtain the list of subcontracted WBS scope and compare the list to the WBS elements to ensure all scope is accounted for in the WBS.
 - b. Trace all subcontracted scope
 - c. Document all discrepancies as compliance concerns.
4. Verify the most recent Work Authorization Documents (WADs) scope of work is consistent with the WBS Dictionary and project SOW.
 - a. Using the current WBS Dictionary and project SOW, compare the most recent WAD scope statement to verify it is consistent. The WAD and/or WBS Dictionary should reference the project SOW paragraph number, if applicable.
 - b. Sample the significant CAs (high dollar, on the critical path) current (most recent) WADs. A sample size of 10% of the total PMB is recommended.
 - c. Document all discrepancies as compliance concerns.

Interview Questions

None

1.A.5 Are all project required deliverables included in the WBS as applicable?

Discussion

Anything defined in the PEP or other documents defining project scope to be delivered must be defined within the WBS as it is part of the project scope. This includes, but is not limited to, CD-0 through CD-4 documents, approval packages (regulatory or project specific), permits required, and WP verifications (construction vice EVM term). This same work scope should be described in the WBS Dictionary.

Impact of Noncompliance

Not defining externally required items prohibits DOE from visibility regarding the completion of scope.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Verify the WBS includes all required deliverables in the PEP/SOW.
 - a. Review the project PEP/SOW for all items to be delivered to DOE and trace those deliverables-to the WBS and WBS Dictionary.
 - b. Document all discrepancies as compliance concerns.

Interview Questions

None

1.A.6 Is the current WBS reconcilable to the original project WBS throughout the incorporation of the relevant change documents?

Discussion

The WBS and WBS Dictionary are maintained throughout the life of the project based on a disciplined application of the systems engineering process for project management execution. It is important that they are updated with any change in scope direction at the project level. Since the WBS is prevalent throughout all of the EVM artifacts, and also because it changes infrequently, versions of the WBS should be kept historically so that they can be reconciled with changes as approved by DOE.

Impact of Noncompliance

Failure to maintain reconciliation of the current WBS to authorized contractual changes may result in the WBS not including all work scope and visibility of that scope in the project WADs.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Verify the current WBS reconciles to the original WBS for any WBS elements that have changed.
 - a. Obtain and review project modifications/change documentation (if applicable) and compare to project Statement of Work (SOW)/PEP for WBS changes.
 - b. Examine all changes. This is an intermediate step and the purpose is background to the following step.
 - c. Obtain the original WBS Dictionary and compare the original WBS Dictionary with the current WBS Dictionary. Are all changes as a result of the previous trace step? Do the WBS Dictionary changes reconcile?
 - d. Document all discrepancies as compliance concerns.

Interview Questions

None

Guideline 1 – WBS Typical Artifacts Common to the QE LOIs

- SOW
- WBS
- Traceability matrix from government requirements (e.g., SOW, Build Specifications) to WBS
- WBS Index/Dictionary
- IPMR/CPR reports
- PEPs
- Base project contract and modifications

Guideline 2 – Define the Project OBS

Identify the project organizational structure, including the major subcontractors, responsible for accomplishing the authorized work, and define the organizational elements in which work will be planned and controlled.

The guideline is defined by Qualifying Expectations Lines of Inquiry shown below.

QE LOI Guideline 2

2.A.1	Does a single OBS exist that contains all of the responsible organizational elements necessary to execute the project to include major subcontracted and inter-organizational work?
2.A.2	Is the OBS current and reflected in IPMR/CPR Format 2 as applicable?
2.A.3	Have the appropriate EVM compliance requirements been flowed down contractually as required per the contractor's internal procedures or DOE O 413.3?
2.A.4	Is all authorized work assigned to responsible organizational elements?

QE LOIs Repeated With Discussions

2.A.1 Does a single OBS exist that contains all of the responsible organizational elements necessary to execute the project to include major subcontracted and inter-organizational work?

Discussion

There are several aspects to this QE LOI

- **OBS:** There is an OBS that defines responsibility for managing resources within the project. The structure is a logical parent-child relationship like the WBS (Guideline 1) although not typically at the same depth. There are multiple types of project organizations, e.g., project teams, project matrix organizations, Integrated Product Teams (IPTs), functional organizations, etc.
- **Responsibility:** The OBS identifies which managers in the contractor's organizational structure are responsible for executing a specific scope of work consistent with their internal organizational structure of departments, units, teams, and/or subcontractors. It provides a description of the organization's roles and responsibilities for each segment of work, including subcontracted and inter-organizational efforts. The project manager uses a

project OBS to reflect the assignment of management accountability and authority for all work supporting project objectives. When designating the internal organization responsible for managing the project efforts, the contractor must assign a manager with sufficient authority and responsibility to ensure performance of the authorized work. The manager assigned to subcontractor work must have full responsibility for the authorized work. The CAM is the lowest level of the OBS that is responsible for scope, schedule, and budget. The PM may be the highest level of the OBS. The CAM may report directly to the PM (a flat 2 level example) or there may be intermediate level functional managers who report to the PM (a multi-tiered OBS example). The PM's authority, senior leadership, and indirect and accounting authority, although not necessarily in the OBS must also be demonstrable.

- Major subcontractors: The OBS defines responsibility. Major subcontractors and some inter-organizational entities may have performance responsibility. If so, they must be defined in the OBS. Typically, major subcontractors are either high value or determined to be critical to the project. The contractor's SD must define what determines a major subcontractor.

Responsibility is defined in the OBS. It is demonstrated by reports and approvals within the EVM process. For example, work authorization (guideline 9), variance reports (guideline 23) and baseline changes (Guidelines 28-32) are approved through the OBS. The OBS reflects the project organization structure i.e., projectized or functional.

The OBS and related organizational charts are living documents. Over time, people change positions. Each month the OBS should be reviewed for currency and adjusted as necessary. This also is documented in the RAM or other documentation as discussed in guideline 5. Where a contractor does not typically have a project internal organizational chart, the project should document the equivalent as the basis for the OBS and, at a minimum, have a coding structure that provides the hierarchical relationships of personnel within the project.

Impact of Noncompliance

Failure to define the responsible organization hinders the effectiveness of project execution.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Obtain a copy of contractor's organizational chart and verify all organizations responsible to complete the work are identified.
 - a. Obtain the company level organizational charts
 - b. Obtain the RAM
 - c. Compare the PM/CAM in the RAM to the OBS and organizational charts.
 - d. Compare the documented indirect and accounting authorities to the organizational chart. Also note where the PM reports in the organizational charts.
 - e. Are major subcontractors identified in the RAM?
 - f. Are there major components of responsibility for the project not defined as responsible to the CAMs identified?
 - g. Document all discrepancies as compliance concerns

2. Verify the OBS at the CAM level rolls up into the functional organization level.
 - a. Locate the CAM on the RAM and organization charts.
 - b. Obtain a report covering several weeks of people charging to the project.
 - c. Verify the organization of the people charging.
 - d. Compare the people charging with the organization chart (names and/or organization).
 - i. Verify the CAM has control over the resources (the people charging report to the CAM) or report to people above the CAM or outside the organization. Indicators of control if step d. is no:
 - ii. An agreement with another organization
 - iii. Authority to influence the work performed by the organizational resources
 - iv. Authority to review charges each period and correct errors
 - v. Regular meeting with the support organization/shop owning the resource. This most likely will need to be reviewed on-site.
 - vi. If a higher organization level has a significant resource then is this indicated by the OBS above the CAM?
 - e. Look at WADs, VARs, EAC justification and change control documentation.
 - i. Review the approvals and see if intermediate management is approving. If so, then verify the intermediate manager is in the RAM.
 - f. Document all discrepancies as compliance concerns

3. Obtain a list of responsible major subcontractors or inter-organizational units (if applicable) and verify subcontract management responsibilities are identified in the OBS.
 - a. Document all discrepancies as compliance concerns

4. Compare the WBS Dictionary to the RAM or OBS
 - b. Based on the results of QE LOI test 1.A.4.2 which was a review of the WBS Dictionary and scope compare the WBS Dictionary scope to the WBS assignment in the OBS.
 - c. Is the work assigned consistent with the organization assigned?
 - i. Negative examples include electric work assigned to mechanical organizations.
 - d. Document any inconsistencies for discussion in CAM interviews.

Interview Questions

None

2.A.2 Is the OBS current and reflected in IPMR/CPR Format 2 as applicable?

Discussion

The Contract Performance Report (CPR) and the Integrated Project Management Report (IPMR) both have Format 2 which requires reporting earned value by the OBS. In all cases, the RAM and OBS used by the project must be consistent with the Format 2 OBS. Note: If Format 2 is not a contractual requirement this QE LOI would focus on the OBS being current and containing the identity of all CAMs.

Impact of Noncompliance

Failure to keep the OBS current and consistent with the RAM or IPMR/CPR Format 2 is not effective for successful project management.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Review the OBS and compare with any change documentation that would change the OBS structure (CAMs, functional managers, etc.).
 - a. Verify the OBS and RAM are current and consistent with each other.
 - b. If current, compare the OBS with the EVM Cost Tool data and the CPR/IPMR Format 2 (if contractually required) to determine if they are consistent and there is a single OBS used on the project.
 1. $X = \#$ of mismatches between the OBS, the EVM Cost Tool data, and the IPMR/CPR Format 2.
 2. Document all discrepancies as compliance concerns

Interview Questions

None

2.A.3 Have the appropriate EVM compliance requirements been flowed down contractually as required per the contractor's internal procedures or DOE O 413.3?

Discussion

Earned value requirements may need to be flowed down from the prime contractor to the subcontractor or intra-organization unit. Flow down is typically based on subcontract scope, size, and project type. As a minimum, the contractor should flow down EVM requirements consistent with DOE O 413.3 and its internal EVM process.

Regardless of EVMS flow down to a subcontract or inter-organizational unit, the prime contractor is not absolved of responsibility for the EVMS compliance for the scope of work. For example:

1. If the EVMS is flowed down to the subcontractor, the prime is responsible for review of the subcontractors earned value processes, surveillance, and verification of the data reported monthly. If the prime disputes the earned value status of the subcontract or the EAC, they may work with subcontractor technical representative to resolve the dispute and then change the data in the prime EVM Cost Tool and scheduling system if the schedule is resource loaded. In all cases the prime should report the best information possible as to the current progress and at completion. Any differences between the prime and subcontract reporting are documented as to the justification/logic.
2. If EVMS requirements are not flowed down to the subcontractor (for example, a fixed price contract), the prime is responsible for reporting the work performance at the same level as if internally performed.

Impact of Noncompliance

Failure to manage a significant component of the project with EVMS requirements affects the integrity of EVMS reporting for the total.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Review the contractor's SD to determine their subcontractor and inter-organizational policies and procedures for EVMS flow down requirements, as well as DOE O 413.3.
 - a. Verify the contractor's SD policies and procedures are consistent with DOE O 413.3.
 - b. Document all discrepancies as compliance concerns

2. Review the list of major subcontractors and inter-organizational work orders with an EVMS clause for flow down requirements and compare to the OBS to verify that all major subcontractors and inter-organizational work with the flow down requirements are included in the OBS.
 - a. $X = \#$ of major subcontractors and inter-organizational elements with an EVMS DOE Clause flow down requirement not included in OBS
 - b. Tolerance = 0
3. Obtain the contractor's Subcontractor Data Requirements List (SDRL) for those subcontractors and intra organizational efforts with EVMS flow down requirements – verify the requirements are consistent with the contractor's SD policies
 - a. Verify the requirements are consistent with DOE O 413.3.
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

2.A.4 Is all authorized work assigned to responsible organizational elements?

Discussion

The organization defines the responsible people on the project. Work authorization flows through the OBS as the responsibility is assigned to people. The entire project scope defined in guideline 1 must be assigned to responsible managers within the OBS. The intent is that scope should be traceable from the project level through the OBS to the CA level.

Impact of Noncompliance

Failure to assign responsibility for project scope to managers listed in the OBS represents a break in the chain of responsibility for planning and managing the project.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Trace the project scope through the OBS
 - a. Examine the OBS and the RAM or other document as provided by the contractor. Are there multiple levels between intermediate managers assigned responsibility or simplified directly between the PM and CAM?
 - b. For each level of the OBS, examine the WBS Dictionary or work authorization for the scope assigned to that OBS level.

- c. Is all of the scope accounted for? Is there any duplicated scope assigned to multiple managers?
- d. Document all discrepancies as compliance concerns

Interview Questions

None

Guideline 2 – OBS Typical Artifacts Common to the QE LOIs

- Project organizational chart (to include functional management when applicable)/OBS
- RAM
- Documented roles and responsibilities (prime and major subcontractor(s))
- List of major subcontractors/inter-divisional work orders with EVMS flow down
- IPMR/CPR Format 2

Guideline 3 - Integrate Subsidiary Management Processes

Provide for the integration of the planning, scheduling, budgeting, work authorization and cost accumulation processes with each other, and as appropriate, the project work breakdown structure and the project organizational structure.

The guideline is defined by Qualifying Expectations Lines of Inquiry shown below.

QE LOI Guideline 3

3.A.1	Are the planning, scheduling, budgeting, work authorization and cost accumulation systems integrated with each other via a common coding structure and as appropriate with the Work Breakdown Structure (WBS) and the Organizational Breakdown Structure (OBS) at Control Account (at a minimum) through the total project level?
3.A.2	Are the budgets in the RAM, CAP, and the IPMR/CPR traceable to the Work Authorization?
3.A.3	Are the IMS and EVM Cost Tool integrated and, as applicable, are they both integrated with the Work Authorization and CAP.
3.A.4	Does the contractor's EVM Cost Tool show periods of performance dates (baseline and forecast) for Summary Level Planning Packages, Control Accounts, Work Packages, and planning packages, and that match the dates for the same items in the IMS?
3.A.5	Where EV flow down is required, is subcontractor EV data reconcilable with the prime contractor EV data, with any differences explained in the IPMR/CPR Format 5?

QE LOIs Repeated With Discussions

3.A.1 Are the planning, scheduling, budgeting, work authorization and cost accumulation systems integrated with each other via a common coding structure and as appropriate with the Work Breakdown Structure (WBS) and the Organizational Breakdown Structure (OBS) at Control Account (at a minimum) through the total project level?

Discussion

A fundamental requirement in earned value is consistency between the earned value components. The integration of separate and interdependent management systems, processes and operating procedures enables consistent and relatable data across the enterprise management systems and the EVMS. This is obtained through the consistent use of the WBS and OBS in each subsystem with establishment of a unique coding

structure (work order/job order/task code charge number structure) that facilitates the linkage between the planning, scheduling, budgeting, work authorization, cost accumulation, performance measurement and change control process. Unique coding structures established by the contractor will support the transfer of data and allow the data derived from one system to relate to and be consistent with the data of each of the other systems at the CA level through the total contract level. The resulting integration of technical, cost and schedule data enables project management to effectively manage and control execution of the project work scope. The system must integrate subcontractor data.

Data at the same WBS and OBS level should be reported consistently between the subsystems. For example; if a discrete WP is behind schedule in the IMS, it must be behind schedule in the EVM Cost Tool. The accounting structure must be integrated with the WBS at the WP or CA level of the WBS. And the work authorization scope, schedule (PoP), and budget must be consistent with the IMS and the EVM Cost Tool.

This guideline and QE LOI covers all of the system interfaces being consistent. For example, credibility of the integrity of the WBS is in guideline 1. However the WBS being integrated in the IMS is guideline 3.

Impact of Noncompliance

Failure to integrate data reported in subsystems invalidates the usefulness of reported earned value information. Inconsistent reports require independent verification of all of the information.

Verification Steps

Data Analysis (Automatable)

1. Determine the total number of remaining WPs in IMS where “physical % complete” does not match “EVM Cost Tool % complete”.
 - a. $X = \text{Total \# of remaining WPs in IMS where “physical \% complete” does not match “EVM Cost Tool \% complete”}$
Pass: $X = 0$
Fail: $X > 0$
Note: 0 is not a failure as the contractor could put status directly in the cost tool. The match is if the schedule says 20% and the cost tool is claiming 42%.

2. Determine total number of remaining WPs in IMS where baseline and forecast dates do not match EVM Cost Tool dates.
 - a. $X = \text{Total \# of remaining WPs in IMS where “IMS baseline and forecast start and stop are not consistent with the baseline and forecast start and stop in the Cost Tool.”}$
Pass: $X = 0$
Fail: $X > 0$

3. Determine the total # of remaining CAs or WPs with IMS OBS not aligned to EVM Cost Tool OBS.
 - a. X = Total # of remaining CAs or WPs with IMS OBS not aligned to EVM Cost Tool OBS
Pass: X = 0
Fail: Y > 0

4. Determine the total # of remaining CAs or WPs with IMS WBS not aligned to the EVM Cost Tool WBS.
 - a. X = Total # of remaining CAs or WPs with IMS WBS not aligned to EVM Cost Tool WBS
Pass: X = 0
Fail: X > 0

Artifact Traces between documents

(Note: the following tests should be run at the lowest level, either CA or WP, as appropriate)

1. Verify the contractor has a unique coding structure that integrates the subsystems using the WBS/OBS.
 - a. Review the contractor's EVM SD and project procedures (if applicable) to understand how the subsystems are integrated as defined in Guideline 3.
 - b. Review the contractor unique coding structure using the WBS that defines the common data elements that link the management systems/subsystems
 - c. Select an element of the WBS and from the OBS.
 - d. Using the contractor defined coding structure, trace the Work Authorization Documents (WADs) by WBS and OBS elements into CAs.
 - e. Document all discrepancies as compliance concerns

2. Using the same information gained in artifact trace # 1, trace the detail schedule by WBS/OBS into CAs to determine if schedules can be rolled up by WBS and OBS.
 - a. Document all discrepancies as compliance concerns

3. Trace the same information to the accounting charge number structure and trace the accounting data by WBS/OBS into CAs to determine if costs can be rolled up by WBS and OBS.
 - a. Document all discrepancies as compliance concerns

4. Using the same information, review CAPs and performance reports and schedules for consistency.
 - a. Document all discrepancies as compliance concerns

5. Determine the number of WPs/PPs in the IMS with baseline dates that are outside the WAD PoP.
 - a. $X = \text{Total \# of remaining CAs or WPs with baseline dates outside the WAD PoP in the IMS}$
 - b. Tolerance = 0

6. Verify total \$ BAC (from WAD) of remaining CAs (at a minimum) with IMS baseline dates that are outside the WAD PoP.
 - a. $X = \text{Total \$ BAC (from WAD) of remaining CAs (at a minimum) with IMS baseline dates outside the WAD PoP.}$
 - b. Tolerance = 0.

7. Determine the number of remaining CAs where the BAC from the WAD does not match the BAC from the EVM Cost Tool.
 - a. $X = (\text{EVM Cost Tool BAC} - \text{WAD BAC})$ for remaining CAs where the BAC from the WAD does not match the BAC from the EVM Cost Tool
 - b. Tolerance = 0.

8. Verify the total # of remaining CAs or WPs with baseline start and finish dates outside the WAD PoP in the EVM Cost Tool.
 - a. $X = \text{Total \# of remaining CAs or WPs with baseline start and finish dates outside the WAD PoP in EVM Cost Tool.}$
 - b. Tolerance = 0.

Interview Questions

None

3.A.2 Are the budgets in the RAM, CAP, and the IPMR/CPR traceable to the Work Authorization?

Discussion

This QE LOI emphasizes external consistency in reporting. First, the WAD budget must be consistent with the RAM budget. This same budget in the WAD and the RAM must be consistent with the BAC reported in the IPMR/CPR external reports in Column 15 and CBB/TAB totals.

Impact of Noncompliance

Inconsistency between internal and external reporting leads to loss of credibility of the EVMS for its use as a management tool.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Verify budgets are consistent in the WADs, the dollarized RAM and IPMR/CPR.
 - a. Review the WADs and compare budgets authorized with the CA budgets shown on the dollarized RAM to determine if they are consistent.
 - b. Compare total budgets authorized in WADs and the dollarized RAM with budgets (BAC) reported in the IPMR/CPR by WBS (Format 1).
 - c. Compare total budgets authorized in WADs and the dollarized RAM with budgets (BAC) reported in the IPMR/CPR by OBS (Format 2), if Format 2 is contractually required.
 - d. This trace is to be performed for 3 consecutive periods, with the last being the most current period in the data call.
 - e. Document all discrepancies as compliance concerns.

Interview Questions

None

3.A.3 Are the IMS and EVM Cost Tool integrated and, as applicable, are they both integrated with the Work Authorization and CAP.

Discussion

There are two aspects to this QE LOI; baseline and forecast. The baseline start and finish dates in the WAD must match the baseline start and finish dates in the IMS for the same WBS. Then, the IMS baseline dates must reconcile with the baseline start and finish dates in the EVM Cost Tool. The PoP in the EVM Cost Tool must be the same as the start and finish dates in the CAP.

The WAD and CAP do not necessarily have the same estimated completion date. However, the earliest and latest current schedule date needs to be consistent with the forecast start and finish dates in the EVM Cost Tool (i.e. within the same accounting month).

There may be instances where the annual fiscal year budget management process may impact scope, schedule and budget integration. Under such circumstances, the following expectations must be addressed to maintain the overall integration of the project's scope, schedule and budget. At a minimum:

1. WAD and WBS Dictionary must be detailed for the current fiscal year,
2. The IMS near-term critical path and WAD scope must be detailed for the current fiscal year,
3. Any remaining scope not yet authorized for the current fiscal year is contained in separately identifiable time-phased PPs such that a realistic critical path is maintained for the overall project,
4. Each fiscal year the remaining scope, schedule, and budget contained in PPs is revised based on the annual direction so at all times the total current PMB reconciles with the authorized total project/contract scope, schedule, and

budget. This effort may be in SLPPs so it does not impact the CA level work authorization.

This QE LOI defines basic cost and schedule integration that is expected at all times. It ensures that schedule status is consistent with cost status and individual reports are accurate. The WBS and OBS are used as the basis of the unique coding structure to link between the WADs, the CAPs, the EVM Cost Tool and Schedule.

Impact of Noncompliance

Lack of cost and schedule integration causes reporting to be of little value.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Trace the CA WAD PoP, and budget to the CAP and the PoP to the IMS baseline start/finish.
 - a. X = Total # of remaining CAs (at a minimum) where the baseline start/finish dates do not trace
 - b. Document all discrepancies as compliance concerns.

2. For the remaining CAs in the EVM Cost Tool, compare the Forecast schedule start and finish dates to the ETC start and finish in the EVM Cost Tool.
 - a. X = WPs with IMS to EVM cost tool forecast/ETC inconsistencies.
 - b. Document all discrepancies as compliance concerns.

Interview Questions

None

3.A.4 Does the contractor's EVM Cost Tool show periods of performance dates (baseline and forecast) for Summary Level Planning Packages, Control Accounts, Work Packages, and Planning Packages, and that match the dates for the same items in the IMS?

Discussion

This QE LOI compares the level of planning between the IMS and the EVM Cost Tool. Do all schedule activities roll up to one and only one WP? Are the CAs planned in

the IMS consistent with the identified WPs? And is there consistency between the schedule and cost planning so that:

1. The level of planning and statusing in the EVM Cost Tool is consistent with the IMS.
2. The CAP baseline resource profile is consistent with the IMS PoP for the same WBS
3. The same WBS and OBS are used in the IMS and EVM Cost Tool.

Impact of Noncompliance

Inconsistent planning leads to inaccurate reporting of earned value, making project decisions for management difficult.

Verification Steps

Data Analysis (Automatable)

1. Verify the number of WBS elements in the IMS not aligned with the EVM Cost Tool at the WP, PP level.
 - a. Compare the total remaining CAs (down to WP, PP) in the IMS and to the WBS elements in the EVM Cost Tool to determine the number of WBS elements not aligned.
 - b. $X = \text{Total \# of remaining CAs (at a minimum) in the IMS not aligned to the same WBS elements in the EVM Cost Tool.}$
Pass: $X = 0$
Fail: $X > 0$
2. For remaining CAs, verify the number of OBS elements in the IMS not aligned to those in the EVM Cost Tool at the WP, PP and activity level.
 - a. Review the remaining CAs (down to activity, WP, PP level) in the IMS and compare the number of OBS elements in the IMS to determine the number not aligned in the EVM Cost Tool.
 - b. $X = \text{Total \# of remaining CAs (at a minimum) with IMS OBS not aligned to EVM Cost Tool OBS.}$
Pass: $X = 0$
Fail: $X > 0$
3. For the remaining open CAs, verify that resources are time phased in the EVM Cost Tool in the same way as the IMS.
 - a. Compare remaining CA WPs/PPs in the IMS to resources in the EVM Cost Tool to determine whether resource profiles match.
 - b. $X = \text{Total \# of remaining WPs/PPs in IMS where resource profile does not match EVM Cost Tool resource profile.}$
Pass: $X = 0$
Fail: $X > 0$

4. For the remaining WPs in the IMS, verify that the physical % complete is the same in the EVM Cost Tool.
 - a. Compare physical % complete of remaining IMS WPs to those in the EVM Cost Tool to determine those activities, WPs, and CAs that do not match.. Eliminate any 0% physical percent complete in the schedule.
 - b. $X = \text{Total \# of remaining WPs in IMS where "Physical \% Complete" does not match EVM Cost Tool \% Complete.}$
Pass: $X = 0$
Fail: $X > 0$

Artifact Traces between documents

None

Interview Questions

None

3.A.5 Where EV flow down is required, is subcontractor EV data reconcilable with the prime contractor EV data, with any differences explained in the IPMR/CPR Format 5?

Discussion

This QE LOI does not imply that the prime reports the same numbers as the subcontractor, only that it is consistent. Consistency is that reported for the same month-end, subcontractors must be reported consistently with the prime. If the subcontractor has EVM flow down, then the different accounting months need to be analyzed. If they are close then the cost and schedule information when imported will be consistent. However, if significantly different then the following process is required:

- The schedules for the subcontractor must be stated on the prime month-end as well as their own month-end.
- The subcontractor must report costs to the prime for the week ending that corresponds closest to the prime's accounting month-end and IMS date,
- The subcontractor then carries the remaining period until their month-end as a part of next month's reporting.

Regarding the amount reported, it does not matter what the EVM flow down to the subcontractor is. BCWS, BCWP, and EAC are the prime contractor's best estimate considering compliance to their EVM process. For example, the prime may need to eliminate an inappropriate retroactive change the subcontractor reported. Or the EAC may need to be higher because of some potential REAs from the subcontractor. In all cases the changes are documented and justified.

Impact of Noncompliance

Inaccurate and inconsistent subcontractor reporting is equivalent to lack of credibility in reporting to DOE the status of the project.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Verify the EVM performance metrics are the same in the subcontractor's IPMR/CPR and the Prime's EVM Cost Tool.
 - a. Review the dollar value of the open subcontractor CAs where the performance (BCWP, BCWS, ACWP, EAC, BAC) from the subcontractor's IPMR/CPR does not match the performance metric from the Prime's EVM Cost Tool. The exception is where the prime CAM has justified a departure because of their assessment. This affects primarily BCWP and EAC. See guideline 2.
 - b. $X =$ the \$ value of the open subcontractor CAs where the performance metric (BCWP) from the subcontractor's IPMR/CPR does not match the performance metric in the EVM Cost Tool / $Y =$ total \$ value of the corresponding metric in the EVM Cost Tool.
 - c. Document all discrepancies as compliance concerns.
2. Verify the subcontractor and prime's IMS baseline start and finish dates are the same for the subcontractor's scope of work.
 - a. Review the remaining subcontractor IMS events and determine the total # of remaining baseline start and finish date inconsistencies between the subcontractor IMS and the prime IMS. The exception is where the prime CAM has justified a departure because of their assessment. This affects primarily schedule completions. See guideline 2.
 - b. $X =$ Total # of remaining baseline start and finish date inconsistencies between the subcontractor and Prime IMS.
 - c. Document all discrepancies as compliance concerns
3. Verify the subcontractor and prime's IMS forecast start and finish dates are the same.
 - a. Review the total number of remaining subcontractor IMS events to determine the number of remaining forecast start and finish inconsistencies between the subcontractor and prime IMS. The exception is where the prime level CAM has justified a departure because of their assessment. This affects primarily schedule completions.
 - b. $X =$ Total # of remaining forecast start and finish inconsistencies between the subcontractor and prime IMS.

- c. Document all discrepancies as compliance concerns.

Interview Questions

None

Guideline 3 – Integration Typical Artifacts Common to the QE LOIs

- Data item matrix describing the unique coding structure that defines the common data elements that link the management systems.
- Data-related products that relate to the unique coding structures.
 - WBS and OBS
 - WBS Dictionary
 - RAM
 - WADs
 - IMS
 - Accounting and financial reports
 - Management reports from EVM Cost Tool such as control account, WP/PP plans
 - Subcontractor IPMR or CPR and IMS
 - Mapping of EVMS data from subcontractor to/from prime
 - Change control documentation
 - Variance Analysis Reports (VARs)

Guideline 4 – Identify Overhead Management

Identify the company organization or function responsible for controlling overhead (indirect costs).

Guideline 4 and the related QE LOIs are discussed in Section 7.0. This guideline along with guidelines 13, 19, and 24 are described as a whole in Section 7.0.

Guideline 5 - Integrate WBS/OBS to Create Control Accounts

Provide for integration of the project work breakdown structure and the project organizational structure in a manner that permits cost and schedule performance measurement by elements of either or both structures as needed.

The guideline is defined by Qualifying Expectations Lines of Inquiry shown below.

QE LOI Guideline 5

5.A.1	Is each control account assigned to an organizational element directly responsible for the work and identifiable to a single element of the WBS?
5.A.2	Is there only one CAM assigned to each control account?
5.A.3	Is the CAM identified in the RAM?
5.A.4	Does the CAM have responsibility, authority, and accountability for the work scope and performance of the control account?
5.A.5	Is subcontractor data validated by the Prime contractor's responsible CAM?
5.A.6	Are control accounts established at appropriate levels based on the complexity of the work and the control and analysis needed to manage the work effectively?

QE LOIs Repeated With Discussions

5.A.1 Is each control account assigned to an organizational element directly responsible for the work and identifiable to a single element of the WBS?

The intersection of the WBS and the OBS represents where the CA is established. That intersection is necessary to understand the assigned responsibility for managing, controlling, and facilitating the allocation of resources to the work scope and permits cost accumulation and performance measurement. There may be one or more responsible organizations supporting a single WBS or multiple CAs within one OBS element. Generally, this occurs when the work within a WBS element must be segregated for management control purposes that are driven by scope and exit criteria (i.e., completion of the effort). The illustration below reflects multiple CAs assigned to one OBS element. Establishment of CAs should consider the complexity of the work and the efficiency of the organization. This structured approach assists the project manager with assigning responsibility and authority for performing the work scope contained in the WBS. Note: Labor, HDV material, significant subcontracts or LOE may be managed in separate CAs as required within the intersection of the WBS and OBS responsibility.

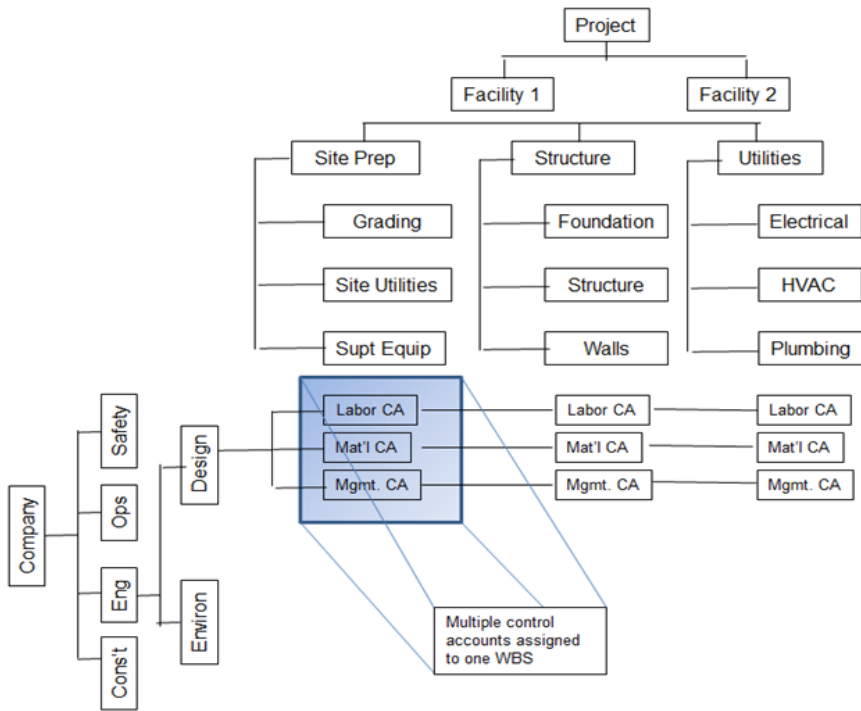


Figure 2 - WBS and OBS Integration and Control Account (CA)

Impact of Noncompliance

Failure to define CAs properly can create ineffective management or increased cost.

Verification Steps

Data Analysis (Automatable)

1. Verify in EVM Cost Tool each CA is assigned to only one organizational element (OBS).
 - a. $X = \#$ of CAs in RAM with more than one OBS element or no assignment
 Pass: $X = 0$
 Fail: > 0

2. Verify in EVM Cost Tool each CA has only one WBS element identified.
 - a. $X = \#$ of CAs with more than one WBS element or no assignment
 Pass: $X = 0$
 Fail: $X > 0$

Artifact Traces between documents

1. Review the RAM to:
 - a. Verify that at least one CA is designated for each identified WBS and OBS element intersection
 - b. Verify that CAs are not allocated to more than one OBS or to more than one WBS
 - c. Verify that where CAs are not designated, the contractor has established SLPPs.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

5.A.2 Is there only one CAM assigned to each control account?

For the CAM to have sole responsibility, only one CAM can be identified to a CA. This establishes responsibility and authority for the accomplishment of the work scope defined in the CA.

Impact of Noncompliance

More than one CAM per CA indicates lack of authority over the CA.

Verification Steps

Data Analysis (Automatable)

1. Review the total CAs in the EVM Cost Tool data to determine if any CAs have more than one CAM assigned to each CA.
 - a. $X = \#$ of CAs in EVM Cost Tool that have multiple CAMs assigned or do not have a CAM assigned
Pass: $X = 0$
Fail: $X > 0$

Artifact Trace between documents

None

Interview Questions

None

5.A.3 Is the CAM identified in the RAM?

The CAM needs to be identified in the RAM consistent with the WADs and organization charts. The CAM should be the lowest level of the RAM.

Impact of Noncompliance

Failure to identify the CAM results in no CAM responsible for managing the control account

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Compare the CAM assignments in the RAM to the CAM assignments in the Work Authorization Documents (WADs) to verify they are the same.
 - a. This trace is to be performed for the most current period in the data call.
 - b. Document all discrepancies as compliance concerns
2. Review change documentation to see if there have been any changes to the assignments of CAMs and compare to the RAM, WADs, and OBS/Org Charts to verify the CAM assignments are consistent and current in all documentation.
 - a. This trace is to be performed for the most current period in the data call. -
 - b. Document all discrepancies as compliance concerns.

Interview Questions

None

5.A.4 Does the CAM have responsibility, authority, and accountability for the work scope and performance of the control account?

The CAM needs to be in a position recognized for having the responsibility, authority and accountability for the performance of the CA.

Contractors may be organized in different ways leading to the following scenarios:

1. Single project for entire contractor organization: In this case, the contractor's organization is the same as the project organization. CAMs have either direct authority over their labor force or their functional management (if applicable) supports them and it is recognized the CAM has supervisory authority. This is

typically demonstrated in an organization chart and means the CAM has operational authority over the resource(s).

2. Matrix management: The project is supported by functional organizations and the CAM is the interface between the project and functional organizations. This may be referred to as an Integrated Project Team (IPT) lead. In this case, the CAM reports to “two bosses”. The CAM reports to the project manager regarding his project specific responsibilities and reports to their functional manager for other responsibilities. A CAM may be full time on a project or have additional responsibilities outside the project. This depends on the size of the CA(s) for which they are responsible and how the contractor is organized. In a matrix environment, the labor executing the work scope does not report directly to the CAM, but the CAM provides the operational direction necessary to accomplish the work. Typically, the CAM has the ability to work with a higher level of functional management regarding staffing requirements and any personnel performance issues.
3. Subcontracted work: If a prime CAM is assigned responsibility for the work of the subcontractor they do not directly manage the sub's resources, but work with the subcontractor regarding the services being furnished.

Can a CAM be supported by WP managers? The CAM can delegate authority to lower levels to assist with managing and statusing progress of the CA. In this case, the CAM may have a technical supervisor reporting to him/her who has other personnel reporting to him/her for their daily direction.

Regardless of any Work Package Managers, CAM still should have a thorough working knowledge of the technical details of the CA, which includes schedule, resources, work status, EACs, and baseline control.

If the CAM cannot demonstrate responsibility, authority, and accountability, the OBS and WBS should be revisited to define the CA at a level where this can be demonstrated.

Impact of Noncompliance

Failure to establish the responsibility, authority and accountability of the CAM indicates an ineffective EVM implementation.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Select a sample of CAMs from the RAM and compare back to the Organization Chart for the Project to determine CAM authority over CA resources.
 - a. Look for direct line of authority from PM to CAM to CA team
 - b. Look for Intermediate Manager (IPT, Functional Mgr.) authority over CAMs
 - c. Review any agreements between the CAMs and Functional Managers to determine if there is any delegated authority from Functional Managers to the CAM over CA resources.
 - d. Review WADs to determine if CAM signed and dated them and if they are signed by the PM.
 - e. If CAM is getting resources from external organizations, determine whether work authorizations with the external organizations are in writing (CAM authority). Ask to see the documentation.
 - f. This trace is to be performed for 3 consecutive periods, with the last being the most current period in the data call.
 - g. Document all discrepancies as compliance concerns.

2. Using the same sample of CAMs from the RAM, verify the CAM's knowledge of responsibility, authority, and accountability of CA performance by reviewing the following:
 - a. Review labor runs with CAMs to determine CAM review and input. Were corrections made as a result of CAM review?
 - b. Review detail CA schedules for CAM inputs, status and approval.
 - c. Understanding of CAP and CA planning.
 - d. Review baseline change documentation for CAM's input, approval and dates.
 - e. Review Variance Analysis Reports (VARs) for CAM's input, approval and dates.
 - f. Review EAC documentation for CAM's input, approval and dates.
 - g. Review Corrective Action Logs to determine CAM's actions.
 - h. This trace is to be performed for 3 consecutive periods, with the last being the most current period in the data call.
 - i. The CAM must demonstrate they understand the CA and manage the scope, schedule, budget aspects.
 - j. Document all discrepancies as compliance concerns.

Interview Questions (CAM)

1. Do you have operational authority over the CA resources?
 - a. Are you their supervisor? Show me the organization chart. If a supervisor, show me the documentation.

2. Have you been delegated authority over your CA resources?
 - a. If so, do you have an agreement between you and the functional managers? If so, please show me the agreement.

3. Do you have the right to appeal staff reassignment to a higher level of functional management?

4. Can you explain the technical content of any schedule task and the justification for the predecessors and successors?
5. Select 3 CAMs to demonstrate knowledge of detail plan. Select 3 CA/WPs and select remaining discrete activities. Ask the CAM to explain technically what the content of the activities and WPs are as compared with their scope.
6. Can you explain and justify:
 - a. The overall ETC profile?
 - b. The current BCWP assessment?
 - c. The last two baseline changes?

5.A.5 Is subcontractor data validated by the Prime contractor's responsible CAM?

The prime contractor cannot delegate EVM responsibility for a portion of its work. The prime is always responsible for the integrity of the subcontractor information. Typically, subcontractors in DOE are FFP which makes this LOI is even more important. Guideline 2 discussed about flowing down EVM requirements to the subcontractor. Regardless of the approach, a prime CAM needs to be identified to review and approve or change the subcontractor provided information as reported in the prime EVM Cost Tool. WP managers may be assigned (as discussed in the previous QE LOI), but that does not relieve the CAM of the same responsibility. A CAM may be supported by project controls in validating subcontractor imported data, but the CAM is ultimately responsible for the validation. The prime CAM must review the baseline, status, and EAC of the subcontractor and update, as appropriate, to be realistic. The status and EAC reported by the prime is based on the prime's assessment of the subcontractor information. Any changes between the subcontract reporting and the prime reporting of the subcontract information should be justified and documented.

Impact of Noncompliance

Failure of the prime CAM to assess the subcontractor status makes the overall reporting suspect.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

None

Interview Questions

1. Have any changes in subcontractor reported information been made in the current reporting period?
2. What is the subcontract review process you follow to verify data monthly?
3. When do you receive reports and how much time do you have to reconcile?
4. Are you allowed to change subcontract BCWP and EAC?

5.A.6 Are control accounts established at appropriate levels based on the complexity of the work and the control and analysis needed to manage the work effectively?

A CAM may be responsible for more than one CA. The key is that the CAM must be able to demonstrate effective control of the CA(s). The larger the staff, the more CAs open at the same time means the CAM, all other factors equal, has more difficulty demonstrating effective control. There are no dollar/span of management thresholds limiting a CAM's responsibility. A CAM's technical background, experience, and time devoted to the CAM responsibilities are the only limits/factors that guide how many and the scope of CA(s) one CAM can be responsible for. Generally, unopened future CAs are not the same concern as open CAs.

Impact of Noncompliance

CAs established at inappropriate levels impede the CAMs ability to effectively manage the CA.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Determine the different technical disciplines each CAM is responsible for.
 - a. Review the RAM to determine which functional area the CAM is representing.
 - b. If a CAM represents more than one technical area, review the performance of the CAs.
 - c. Review CPI, SPI, EAC, TCPI, and VARs of the applicable CAs for performance issues
2. Determine the quantity of open CAs each CAM is responsible for.
 - a. Review the RAM to count the number of CAs assigned to each CAM

- b. Consider the top five CAMs for reviewing their effective management of their CAs.
- c. Review CPI, SPI, EAC, TCPI, and VARs of the applicable CAs for performance issues

Interview Questions

1. CAM – Select 3 random CAs. Please explain the technical scope of the CA and the current status?
2. What is the percentage of your time dedicated to the scope, schedule, and budget responsibilities for your CA(s)?

Note: Part of this QE LOI is verified in the other guidelines as the CAM explains the schedule, budget, variance analysis, and revisions. If the CAM does not understand any significant aspect of CAM responsibilities as related to the scope, schedule and budget they are responsible for this QE LOI may not be met.

Guideline 5 – CA Typical Artifacts Common to the QE LOIs

- RAM
- IMS
- Management reports from EVM Cost Tool prime
- CAPs

SECTION 3.0 PLANNING, BUDGETING AND SCHEDULING (GUIDELINES 6-15)

The focus of the Planning, Scheduling, and Budgeting category is to develop plans and strategies to achieve the desired program/project cost, schedule, and technical objectives. This includes the identification of short and long-term resource needs. The ten guidelines (6 – 15) that comprise this category set the foundation for integrating scope, schedule, and budgets into a baseline against which accomplishments will be measured. This baseline, called the Performance Measurement Baseline (PMB), is a dollarized time-phased plan established primarily at the control account level and reflects how the contractor intends to use its resources, including subcontractors, to accomplish all the authorized work (Guidelines 8 and 9). The PMB provides the government and the contractor a common reference point for discussing program/project progress and status (Guideline 15).

Integral to establishing the PMB and critical to the success of any program/project is the use of a fully-integrated networked schedule (Guidelines 6 and 7). The guidelines in this category require development of an integrated network schedule that establishes and maintains a relationship between technical achievement and progress status. The schedule provides visibility into the accomplishment of the activities required for execution of the contractual scope of work and is the basis for creating the PMB.

The schedule structure should also correlate with the information in the Integrated Master Plan (IMP), when the IMP is contractually required. The IMP is an event-based plan consisting of a hierarchy of project events with each event being supported by specific accomplishments, and each accomplishment associated with specific criteria to be satisfied for its completion. The IMP is normally part of the contract and thus contractually binding (see Appendix B. Definitions and Appendix C. References).

On contracts where EVM is required, the Integrated Master Schedule (IMS) is also required [See IPMR Format 6]. The IMS is a fully-integrated, top-to-bottom project schedule that incorporates all levels of schedules into one. The building of predecessor and successor logic relationships at the working level, i.e., a networked schedule, is required to ensure that contractual and program/project events are completed in a timely and logical manner. Whatever approach to scheduling is chosen, there must be both vertical integration (from detailed activities to top level) and horizontal integration (across activities at the same level). In general, the IMP can be thought of as the top-down planning tool and the IMS as the bottom-up execution tool for those plans.

The guidelines further establish the planning parameters associated with the PMB including:

- Establishing the Contract Budget Base (CBB), including authorized unpriced work. (Guideline 8.)
- Using SLPPs for effort that cannot yet be detail planned at the CA level (Guideline 8).
- Authorizing work and identifying significant elements of cost (labor, material, other direct costs) (Guideline 9).

- Partitioning CA work scope into WPs for near-term effort and/or PPs for effort outside the current planning window (Guideline 10).
- Applying the most appropriate earned value measurement technique (EVT) to ensure progress reported against the PMB provides reliable performance data (Guidelines 10 and 12).
- Ensuring the budgets of WPs and PPs sum to the total budget authorized for that CA (Guideline 11).
- Ensuring the PMB includes overhead budgets (Guideline 13).
- Using Undistributed Budget (UB) as a holding account for contractually authorized work scope and budget that has not yet been assigned to an organizational element at or below the Work Breakdown Structure reporting level, either directly to CAs or Summary Level PPs (SLPPs). Because UB is budget tied to specific work scope, it is part of the PMB (Guideline 14).

Allowance is made for a portion of the CBB to be withheld outside of the PMB as Management Reserve (MR) for internal management control purposes. MR is intended to provide the contractor with budget to manage risk within the established contract scope (Guideline 14). Lastly, the guidelines emphasize maintaining the integrity of the PMB by ensuring the sum of lower level budgets does not exceed the total time-phased PMB and that all internal project budgets and management reserve reconcile to the contract target cost, which is the CBB (Guideline 15).

DOE's interpretation of EIA-748 Guidelines Subsections 6-12, 14 & 15 are contained below. Guideline 13 covering overhead budgets is covered in summary with the details in Section 7.0, Indirect Guidelines.

Guideline 6 – Scheduling Work

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.

This guideline is further broken out into subsections for clarification of the Integrated Master Schedule (IMS):

- IMS Content
- IMS Structure
- IMS Validity
- IMS Status

IMS Content: what is included in an IMS

IMS Structure: how the IMS is put together to produce a realistic critical path

IMS Validity: how the IMS is evaluated

IMS Status: how the IMS is updated

6.A Subsection – IMS Content

The IMS represents a model of the activities planned to execute the project work scope. All the project work scope is found in the IMS with the possible exception of level of effort (LOE) activities which are supportive in nature and have no measurable output or product that can be discretely planned at the WP level (reference Guideline 12 for further LOE discussion). The discrete activities are time phased and sequenced, accurately reflecting how the work is to be performed. Predecessor and successor relationships link the activities together to facilitate the timing and order in which the activities are planned to be conducted. The IMS contains project milestones, events, decision points as well as external dependencies. External interfaces that may impact the project schedule must be shown as predecessors or successors to activities in the project. The IMS is an integrated, networked schedule containing all the detailed discrete work packages and planning packages (or lower level tasks or activities) necessary to support the events, accomplishments and criteria of the IMP (when the IMP is contractually required). The IMS should be directly traceable to the IMP and should include all the elements associated with development, production or modification, and delivery of the total product and project high level plan. If contractor schedule margin is used, it should only be used immediately preceding a DOE Critical Decision milestones such as CD-4 and should be reflected in the baseline as well as the status schedules. There should be no DOE schedule contingency in the IMS. During the execution of the project, when risks are discovered, activities are created to mitigate such risks. These risk mitigation activities are incorporated in the baseline as well as the status schedules.

The guideline is further defined by QE LOI shown below.

6.A.1	Does the IMS reflect all authorized, time-phased discrete work to be accomplished as described in a PEP, SOW, PWS or other work statement (i.e. Summary Level Planning Packages, WPs and planning packages) to include subcontracted effort and High Dollar Value Material?
6.A.2	Does the IMS contain project milestones, project events, key project decision points and external dependencies that are logically linked within the network schedule/IMS to support critical path analysis?
6.A.3	Does the IMS contain all project discrete activities, WPs, planning packages and summary level planning packages mapped to the correct WBS and OBS element levels?
6.A.4	Is the baseline schedule consistent with the project required dates; i.e. delivery dates or approved Over Target Schedule (OTS) as applicable?
6.A.5	Does the schedule contain external interfaces required as predecessors or successors to project activities?
6.A.6	Does the IMS contain completion activities necessary to achieve the project / contractual deliverables?
6.A.7	If schedule margin is represented as a task in the IMS, does the description contain the words "SCHEDULE MARGIN"?
6.A.8	Is schedule margin only placed as the last task/activity/gap before a critical decision gate (CD-1, CD-2, CD-3, CD-4)?
6.A.9	Does the schedule margin (if any) have a risk basis identified?
6.A.10	Is schedule margin (if any) represented in both the baseline and forecast schedules without resources and on the Critical Path?
6.A.11	Are significant and probable risk mitigation steps included in the schedule, do they align with defined mitigation activities in the risk registry?
6.A.12	Are Schedule Visibility Tasks (SVTs), if used, separately identified, controlled, and limited to representation of activities without resources that impact the logic driven network?
6.A.13	Does the contractor maintain an IMS Data Dictionary to maintain codes that identify as applicable: Subcontractor activities, EVT (including LOE), Risk Mitigation Activities, CLINS, justification of constraints, leads, and lags and other unique text/code information that is unique?

QE LOIs Repeated With Discussions

6.A.1 Does the IMS reflect all authorized, time-phased discrete work to be accomplished as described in a PEP, SOW, PWS or other work statement (i.e. Summary Level Planning Packages, Work Packages and planning packages) to include subcontracted effort and High Dollar Value Material?

Discussion

The IMS is the project plan for accomplishment of all project goals and deliverables. All of the discretely measureable work scope found in project documentation, including subcontracted effort must be planned in the IMS. This ensures relationships between activities in WPs, PPs and SLPPs have been thought out and represent the manner in which the project will be executed. There may be different documents representing the scope of work contractually required on the project. The work scope may be found in a PEP, SOW, PWS or other work statement or ancillary documents depending on the practices of the DOE customer organization. Scope with the Earned Value Technique (EVT) of LOE is not required to be in the IMS because LOE effort is supportive in nature and has no measurable output or product. LOE effort is performed as planned (BCWP = BCWS) and there is no schedule variance (there can only be a cost variance (BCWP – ACWP = CV)).

HDV material must be planned in the IMS with consideration of the baseline purchase request date, purchase order date, the receipt date, and requirement link to where used within the project as applicable. In other words, where the material is required in the project and impacts the labor performance. This requirement is for when the material procurement is in the detail planning period. This level of detail is not required for PPs; however PPs for HDV material should be unique so they can be represented at the higher level in the IMS.

Impact of Noncompliance

Without having all the authorized scope included in the IMS, work scope may not get completed and the critical path may be inaccurate and not useful as a management tool.

Verification Steps

Data Analysis (Automatable)

1. The purpose of this automated test is to search for missing elements in the IMS. This is accomplished by comparing the count of discrete WPs and PPs in both the IMS and the EVM Cost Tool. The formula for the automated test is:

- a. $X = \#$ of incomplete discrete WPs, and PPs in the EVM Cost Tool that are not represented in the IMS / $Y = \#$ of all incomplete discrete WPs, and PPs in the EVM Cost Tool
Pass: $X/Y = 0$
Fail: $X/Y > 0$

Artifact Traces between Documents

1. Review the scope in the WBS Dictionary at the WP and CA levels and verify that the IMS activities are consistent with the full scope.
 - a. Using the resource loaded IMS or EVM Cost Tool data, select 10 CAs based on the significant Budgeted Cost for Work Remaining (BCWR). In addition, select CAs with a variety of Element of Cost (EOC) designation.
 - b. By referencing the IMS Data Dictionary, determine what fields are coded to designate the CA, WPs, as well as SOW reference as available.
 - c. For each CA and related WP (s), use the activity descriptions and SOW references compared to the WBS Dictionary to evaluate if all the scope has been included in the IMS.
 - d. Document all discrepancies as compliance concerns
2. Review the PEP and verify all DOE requirements are contained and appropriately linked in the IMS.
 - a. When reviewing the PEP, check for project and subproject descriptions, integration and specifics of CD submittal, Key Performance Parameters (KPP) and technical (scope) requirements, and reporting requirements to check for in the IMS as milestones and detailed activities.
 - b. Document all discrepancies as compliance concerns
3. Verify the project listing of HDV material is included in the baseline IMS.
 - a. Obtain a list of HDV material. If none then all material is considered discrete (Guideline 21)
 - b. For the detail planning period, verify for each HDV item, the request, the purchase order, the receipt, and requirement link to where used within the project).
 - c. Using the IMS Data Dictionary, determine how HDV material is coded in the IMS.
 - d. Filter for material in the IMS to ensure the HDV is reflected with logical links to the end use.
 - e. Document all discrepancies as compliance concerns

Interview Questions

None

6.A.2 Does the IMS contain project milestones, project events, key project decision points and external dependencies that are logically linked within the network schedule/IMS to support critical path analysis?

Discussion

The IMS is the project plan for accomplishment of all project goals and deliverables. Driving paths may use different project events, deliverables or the project end item (such as CD-3) depending on the reason for running the driving path. The Critical Path for the project is always calculated through the end milestone of the project, typically CD-4. Significant project events, external dependencies and decision points must be reflected in the IMS to facilitate the planning of activities that support these events which then enables a critical or driving path to be determined for any of those items.

When The IMP is contractually required, the IMS is an integrated, networked schedule containing all the detailed discrete work packages and planning packages (or lower level tasks or activities) necessary to support the events, accomplishments and criteria of the IMP. The IMP events, accomplishment and criteria are duplicated in the IMS and detailed tasks are added to depict the steps required to satisfy criterion. The IMS should be directly traceable to the IMP. The result is a fully networked “bottom-up” schedule that supports critical path analysis.

Impact of Noncompliance

Failure to link the schedule to all required milestones and external dependencies means the IMS will not provide accurate dates needed to develop a useable critical path for managerial analysis and decisions

Verification Steps

Data Analysis (Automatable)

1. Review all milestones in the IMS for logical ties
 - a. Fuse: Start milestones missing successors: $X =$ all incomplete Start milestones in the baseline schedule without a successor
Pass: $X = 0$
Fail: $X > 0$
 - b. Fuse: Start milestones missing successors: $X =$ all incomplete Start milestones in the forecast schedule without a successor
Pass: $X = 0$
Fail: $X > 0$
 - c. Fuse: Finish milestones without a predecessor: $X =$ all incomplete Finish milestones in the baseline schedule without a predecessor
Pass: $X = 0$
Fail: $X > 0$
 - d. Fuse: Finish milestones without a predecessor: $X =$ all incomplete Finish

milestones in the forecast schedule without a predecessor

Pass: $X = 0$

Fail: $X > 0$

Artifact Traces between Documents

1. Confirm the IMS contains project milestones, contractual events, project decision points and external dependencies that are logically linked within the IMS to support critical path analysis.
 - a. Review PEP for project milestones, events, key decision points and external dependence requirements.
 - b. Verify that these key milestones are in the IMS as milestones.
 - c. Verify the relationship ties to the key milestones are logical
 - d. Verify the critical path leading to the key milestones.
 - e. Document all discrepancies as compliance concerns
2. If the IMP is contractually required, verify the IMP events, accomplishments and criteria are duplicated in the IMS.
 - a. Verify the IMS is directly traceable to the IMP and includes all of the elements associated with the total product and project high level plan.
 - b. Verify it is a fully networked “bottom-up” schedule that support the critical path.
 - c. Document all discrepancies as compliance concerns.

Interview Questions

1. CAM: Is any of your work tracked outside of the IMS? How is this effort reflected in the IMS?
2. Project Manager/FPD: How are external interface milestones identified, effectively analyzed and controlled?

6.A.3 Does the IMS contain all project discrete activities, WPs, planning packages and summary level planning packages mapped to the correct WBS and OBS element levels?

Discussion

The schedule is a tool for management to use for visibility into various levels of the WBS and OBS. It contains code fields that allow identification of the schedule items as applicable to both the WBS and OBS at various levels. Depending on the company, this may mean only a few levels or possibly many levels. Minimally, this means the WBS must be extended down to the CA level and the OBS to the CAM level. The IMS generally

identifies hierarchical OBS and WBS levels to allow management the ability to view (filter) the schedule from many different perspectives depending on the need.

Entry of LOE activities into the IMS is optional. However, if LOE is loaded into the IMS, it too must be traceable to the correct WBS and OBS elements.

Impact of Noncompliance

Schedule information at the detail and summary levels for both the WBS and OBS will be inaccurate, impairing the ability to analyze resource requirements, budgets, accomplishments and remaining effort.

Verification Steps

Data Analysis (Automatable)

1. Check for WBS assignments to activities
 - a. Fuse: $X = \text{number of activities in the baseline schedule missing WBS assignments (exclude SVTs, SM activities)}$
Pass: $X = 0$
Fail: $X > 0$
 - b. Fuse: $X = \text{number of activities in the forecast schedule missing WBS assignments / (exclude SVTs, SM activities)}$
Pass: $X = 0$
Fail: $X > 0$
2. Check for OBS assignments to activities
 - a. Fuse $X = \text{number of activities in the baseline schedule missing OBS assignments (exclude SVTs, SM activities)}$
Pass: $X = 0$
Fail: $X > 0$
 - b. Fuse: $X = \text{number of activities in the forecast schedule missing OBS assignments (exclude SVTs, SM activities)}$
Pass: $X = 0$
Fail: $X > 0$

Artifact Traces between Documents

1. Select 10 random incomplete discrete WPs and PPs and find them in the IMS.

Verify WBS assignments are correct based on the scope identified in the WBS Dictionary and the task descriptions assigned to those activities. Verify the WBS assignments are at the proper level based on the scope of the work or planning package.

- a. Document all discrepancies as compliance concerns
2. Select 10 random incomplete OBS elements from the EVM Cost Tool where discrete effort is required. Verify the effort exists in the IMS and the activity descriptions indicate all work is assigned to the proper OBS elements at the correct level.
 - a. Document all discrepancies as compliance concerns

Interview Questions

None

6.A.4 Is the baseline schedule consistent with the project required dates; i.e. delivery dates or approved Over Target Schedule (OTS) as applicable?

Discussion

Given the IMS is one of the primary tools for managing the project, important information such as delivery dates must be represented in the schedule baseline. This allows the CAMs to plan the effort in their CAs which support the delivery dates. The IMS encompasses all the discrete project scope and orchestrates the activities to accomplish project goals and requirements in a timely manner. Consistency with project requirements is essential to verify the achievability of the baseline. If an Over Target Schedule (OTS) replan has been approved and implemented, the baseline will be replanned to include the new delivery and project completion dates.

Impact of Noncompliance

Baseline schedules not aligned with contractual requirements may not complete according to contract requirements.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the baseline schedule is consistent with the project required delivery dates, and updated for any project delivery changes.
 - a. Verify the schedule has been baselined.
 - b. Verify the driving paths leading to project deliverables and the Critical Path

- to the project end milestone is logical, based on the contractor-provided end milestone.
- c. Verify the baseline finish dates for the key project dates are equal to or earlier than the contractual requirements.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

6.A.5 Does the schedule contain external interfaces required as predecessors or successors to project activities?

Discussion

For the IMS to provide complete and actionable data to management, it must account for all potential impacts from external sources. Some of these sources include subcontract deliverables, customer furnished equipment or information, material and equipment deliveries, to name a few. Another common example is if the contractor is not responsible for subcontract work given to other government entities that affect the project. These external interface points must be identified, correctly linked to calculate the impacts of early or late performance and may contain appropriate date constraints to simulate the forecasted start or completion from the external source. If date constraints are used, they should be documented and reviewed at least monthly for accuracy.

Impact of Noncompliance

Without logic links to these influences, the schedule may fail to calculate accurate dates or a useable critical path

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Obtain a list of GFE/GFI/GFM deliveries and identify these deliveries are accounted for in the IMS.
 - a. Verify logic ties from these deliveries to successor activities
 - b. If a date constraint is employed, verify the appropriateness of the constraint and documented use on the activity or milestone.
 - c. Document all discrepancies as compliance concerns

2. Review subcontracts for delivery requirements and verify the interfaces representing those requirements are present and linked correctly.
 - a. Document all discrepancies as compliance concerns
3. Compare the subcontractor schedule to the IMS. Verify the alignment of forecast and baseline dates or prime variance justifications.
 - a. Document all discrepancies as compliance concerns

Interview Questions

1. CAMs with subcontractor responsibilities – discuss the method of integrating the subcontractor effort in the IMS and how the linkages are represented for those interfaces
2. CAMs with HDV material or equipment deliveries – discuss how the deliveries are represented and linked in the IMS.

6.A.6 Does the IMS contain completion activities necessary to achieve the project / contractual deliverables?

Discussion

Completion criteria define when an activity is complete. The intent is to create an objective determination that makes it easy to answer the question: “are we done?” Typically, the activity name is a good indicator of when the activity is complete. An example of this is an activity with the name: “conduct thermal test on core sample 1”. On longer duration activities, backup information such as Quantifiable Backup Data (QBDs) or incremental milestones may be used to help assess progress of the activity and specify the completion criteria.

Impact of Noncompliance

Progress status without completion criteria could be inaccurate and create artificial cost or schedule variances.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm the IMS contains completion criteria to achieve the project / contractual deliverables.
 - a. Confirm the project approach to completion criteria. This could be a title, a field in the IMS, or documented in other methods.
 - b. Manual trace to ensure that the IMS baseline activities include specifics to define completion criteria activities, containing a noun, a present-tense verb and clear scope descriptions, consistent and coordinated (coded) with the WBS Dictionary.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

6.A.7 If schedule margin is represented as a task in the IMS, does the description contain the words "SCHEDULE MARGIN"?

Discussion

Schedule margin is an optional technique used to act as a buffer for unforeseen events that could cause a schedule delay. If schedule margin is used in the IMS, it must be

clearly identified in the IMS. To ensure clarity, the activity name contains the text “Schedule Margin”. It may also be assigned to a code field to support filtering requirements of schedule analysis.

Schedule Margin (SM) may also be represented as a gap in the IMS from the last discrete effort before a CD milestone to the CD milestone. If SM is represented as a gap, the start and finish milestones that create that gap should be identified as SCHEDULE MARGIN START in its activity name field.

Impact of Noncompliance

Schedule margin may not be recognized, precluding management using schedule margin to assess and address the impacts of risk in the IMS.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. If Schedule Margin is represented as a task/activity per documented process, verify it is created and labeled “Schedule Margin” in the IMS.
 - a. Review the contractors IMS Supplemental Guidance for details on the use of Schedule Margin.
 - b. If used, conduct a manual trace to document any identified any Schedule Margin in the IMS.
 - c. Search the Activity Name field for Schedule Margin (When represented as a activity, Schedule Margin should be identified as such)
 - d. Confirm it is clearly identified in the schedule, as an activity.
 - e. Document all discrepancies as compliance concerns
2. If schedule Margin is represented as a task/activity per the documented process, verify it is created and labeled “SCHEDULE MARGIN START”
 - a. Review the IMS Supplemental Guidance for details on the use of Schedule Margin.
 - b. If used, conduct a manual trace to document any identified any Schedule Margin in the IMS.
 - c. Search the Activity Name field for Schedule Margin (When represented as a activity, Schedule Margin should be identified as such)
 - d. Confirm it is clearly identified in the schedule, as an activity.
 - e. Document all discrepancies as compliance concerns.

Interview Questions

None

6.A.8 Is schedule margin only placed as the last task/activity/gap before a critical decision gate (CD-1, CD-2, CD-3, CD-4)?

Discussion

If schedule margin is used, it must be located in the IMS as a single activity or gap between the last discrete activity in a critical decision phase and a critical decision milestone (such as CD-3 or CD-4). This will allow the entire project to influence schedule margin and allow management to evaluate the impact of realized risks on the schedule to the CD milestone and take action to address the risks and impacts of the risks.

One of the reasons for this QE LOI requirement is that the definition of schedule margin is a buffer task with no scope, resource assignment, WBS, or OBS. Therefore, logically, it is at the end of a key decision milestone.

Impact of Noncompliance

Schedule margin other than at the end of the project or the completion of a critical decision phase distorts and sub optimizes float management, the driving paths to CD-2 and CD-3 and the project Critical Path to CD-4.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm that schedule margin, if any, is placed immediately preceding contract critical decision milestone in the IMS.
 - a. Review the IMS Supplemental Guidance for details on the use of Schedule Margin.
 - b. If used, conduct a manual trace to document any identified Schedule Margin in the IMS.
 - c. Search the Activity Name field for Schedule Margin (When represented as a activity, Schedule Margin should be identified as such)
 - d. Verify the schedule margin activity has a discrete predecessor (no LOE), and is on the critical path.
 - e. Confirm the successor is DOE's contractor's critical decision milestone (typically CD-4).
 - f. Document all discrepancies as compliance concerns
2. Verify schedule margin activity, if used, does not have resources assigned to it.
 - a. Once identified, if the IMS is resource loaded, check to make sure the schedule margin activity has no resource allocation.
 - b. Document all discrepancies as compliance concerns

3. Verify the Schedule Margin activity is not assigned a WBS, OBS, CAM, CA or WP ID or an EVT.
 - a. Document all discrepancies as compliance concerns

Interview Questions

None

6.A.9 Does the schedule margin (if any) have a risk basis identified?

Discussion

Schedule margin is used to mitigate schedule risk. The amount of schedule margin established is directly related to management's estimation of schedule risk inherent to accomplishing the project goals and deliverables. The relationship between schedule margin and risk in the schedule must be documented and available for review. A risk register is a common repository for the project to document risks and the relationship to schedule margin. Schedule Margin may also be established based upon the results of a formal Schedule Risk Assessment. The EVM SD establishes the policy for the development and maintenance of Schedule Margin with details provided in the Risk Management Plan, IMS Supplemental Guidance or other project documentation.

The forecasted Schedule Margin duration may be reduced, or consumed, over the passage of time. As the impacts of risks are realized the duration of the SM task may be reduced at the direction of the PM. Practically, the SM maybe reduced to 0 days of duration over the course of the project based on risk impacts and managerial actions. Monthly adjustments to the baseline or forecasted duration of the SM are documented in the IPMR/CPR Format 5 report and other monthly reviews as required. The schedule margin baseline is under change control requirements. Changing the forecast SM duration is not subject to change control.

Impact of Noncompliance

Schedule margin without risk identification is not meaningful.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor's published processes for identification, development, maintenance and use of Schedule Margin.

2. Review the project's Risk Register for identification of risks that contributed to the development of the Schedule Margin activities.
 - a. Document all discrepancies as compliance concerns
3. Review the forecast schedule. If Schedule Margin is assigned to the baseline, it should also be present in the forecast IMS.
 - a. Document all discrepancies as compliance concerns
4. Compare last month's forecast schedule to the current forecast schedule. Have the schedule margin durations changed? Are the reasons for the change identified in the current period's IPMR/CPR Format 5 report?
 - a. Document all discrepancies as compliance concerns

Interview Questions

1. Project Controls/PM: What is the basis for the duration established for schedule margin?
2. Project Controls/PM: Was a schedule risk assessment used (recommended) or a rule of thumb?

6.A.10 Is Schedule Margin (if any) represented in both the baseline and forecast schedules, without resources and on the Critical Path?

Discussion

Schedule Margin is established during the planning stages of the project to address the impacts of risk to the contractor's ability to complete the work on time to meet contractual deadlines. Therefore, Schedule Margin is baselined in the IMS to represent the project's schedule reserve to meet the schedule completion date. A baseline plan without Schedule Margin is typically not achievable. The duration of the schedule margin in the baseline and forecast schedule should be equal at the start of the project, or the start of the CD phase it supports. However, as time progresses and the IMS forecast is updated, the SM may be changed at the direction of the PM.

Schedule Margin may be consumed in the forecast schedule with monthly changes documented in the IPMR/CPR Format 5 report. This analysis should take into account the rate of consumption of SM compared to the percent complete of the project. If the percentage of the SM consumption is higher than the project percent complete, it may be an indication that the risks to the project are greater than anticipated. If the schedule margin is totally consumed, it should still be reflected in the schedule with a duration of zero, indicating the SM has been consumed.

Impact of Noncompliance

A baseline without schedule margin has a low probability of success (under 1% if over 3 years or more total duration). Without schedule margin in both the baseline and forecast schedule, management does not have the tools necessary to address and mitigate risks to the schedule.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify Schedule Margin in the forecast schedule is baselined in the IMS. Open the forecast IMS and select the Schedule Margin activity or activities. Verify the presence of Schedule Margin in the baseline IMS, even if the durations are different.
 - a. Document all discrepancies as compliance concerns
2. Review the baseline schedule margin duration. If Schedule Margin is employed on the project, it is baselined with a duration greater than 0. Compare the location (lead into CD-3? CD-4?) and duration of the baseline SM with project documentation describing the risk process and basis of the duration. If SM is employed, review the baselined original duration. If SM is employed as a gap, review the distance between the SM start and CD milestone.
 - a. Document all discrepancies as compliance concerns

Interview Questions

1. PM – If forecast schedule margin duration is greater than the baseline duration what is the justification?

6.A.11 Are significant and probable risk mitigation steps included in the schedule, do they align with defined mitigation activities in the risk registry?

Discussion

Risks that require mitigation are documented in the Risk Register and include those activities chosen to mitigate the risk. Because the probability and impact of some risks are greater than others, it is up to the project to establish thresholds that determine which risks are significant enough to have risk mitigation. All significant and authorized risk mitigation activities are included in the baseline and the forecast of the IMS for visibility and risk impact assessment. Once included in the IMS, the risk mitigation activities in both the risk register and schedule must align. There may be risks found in the risk register that are not found to be significant enough to be planned in the schedule.

Impact of Noncompliance

Risk mitigation activities in the IMS that are not in alignment with the Risk Register means the risk has not been integrated.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm risk mitigation dates in the Risk Registry match baseline and/or forecast dates and/or duration of coded activities in the schedule.
 - a. Verify risk register mitigation items for risks identified as high and moderate are reflected and coded in the IMS
 - b. Confirm the risk mitigation activities in the IMS have baseline and/or forecast start and finish dates corresponding to the dates in the risk register (or durations)
 - c. Tolerance $\leq 5\%$

Interview Questions

None

6.A.12 Are Schedule Visibility Tasks (SVTs), if used, separately identified, controlled, and limited to representation of activities without resources that impact the logic driven network?

Discussion

SVTs represent the work in the IMS that is not in the contractor's scope and therefore not included as part of the contractor's PMB cost, but is related to and may potentially impact the project schedule activities. Examples include customer review of documents, site work performed by other contractors before work can begin, wait times for RFP responses, and material shipping durations. When employed correctly, SVTs provide the reason for a delay in an IMS. They also provide the expected (Baselined), updated forecast and actual durations as the schedule forecast moves in time. The impacts of the SVTs are based on logical predecessor and successor relationships in the IMS. Because they are visible and contain activity names, SVTs are a preferred alternative to lags in the IMS, where documentation on the rationale for the lag is usually hidden from view, if it exists at all.

SVTs must be identified in the schedule with "SVT" in the activity name, along with a description of the SVT activity. Because the SVT does not have scope, it must not have resources and it does not have an EVT. The inclusion of a value in an activity code field is not required, but is helpful in separating out SVTs from other activities during filtering,

grouping and schedule health assessment exercises. SVTs should have a contractor task owner and have their status updated as required, generally with outside consultation (as they represent outside project effort).

Note: The activity name requirement above may be addressed in the optional activity code field and the Data Dictionary provided during a review.

Impact of Noncompliance

Without SVTs, the schedule may be missing potential driving activities creating inaccurate activity dates, float values, driving and critical paths.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. For non-PMB activities, confirm the appropriate use of SVTs.
 - a. If used, verify SVTs are separately identified, and labeled with "SVT" in the description
 - b. Confirm all SVTs are baselined in the schedule
 - c. Confirm documentation exists in the IMS Supplemental Guidance or other documentation, to explain any PoP conflicts between the IMS because of the use of SVTs in the baseline.
 - d. Verify SVTs have no resources assigned, are not coded as zero value WPs, not represented as lags or used as constrained milestones.
 - e. Confirm SVTs have logical predecessors and successors.
 - f. Document all discrepancies as compliance concerns

Interview Questions

1. CAM/Scheduler: If SVTs are not used to represent non-PMB activities that could impact the logic driven network, how are activities with external scope modeled in the IMS?

6.A.13 Does the contractor maintain an IMS Data Dictionary to maintain codes that identify as applicable: Subcontractor activities, EVT (including LOE), Risk Mitigation Activities, CLINS, justification of constraints, leads, and lags and other unique text/code information?

Discussion

The schedule is a tool that integrates many other pieces of information, such as the WBS and OBS. However, each contractor can use different schedule fields to meet the integration requirements. This QE LOI requires a data Dictionary or map of what field the contractor is utilizing for which purpose. The contractor's IMS Data Dictionary must include all codes that identify and describe all of the code fields and values used in the IMS and how they are used to filter and group in the schedule. This information is necessary for personnel and management at all levels to be able to read and understand the IMS data. There are typically thousands of activities in the IMS and this is required to make sense out of the information. Changes to these code fields, such as the addition of new fields or the elimination of old ones are documented in the monthly IMS deliverable and documented in the monthly IPMR/CPR Format 5 report.

Included in the contractor's IMS Supplemental Guidance are methods to exclude SVTs and Schedule Margin activities from certain filters and tests. The guidance also identifies fields used for the primary, secondary and tertiary critical paths, as well as fields used to identify driving paths to CD milestones or other important delivery milestones in the project. The use of the provided float path field in P6 is commonly used to identify critical or driving paths, but is not eligible for permanently identifying those paths because it changes every time the IMS is scheduled. When an IMS is delivered, the reviewer must be able to examine the same paths in the IMS the Contractor developed and documented in the IPMR/CPR Format 5 report.

Impact of Noncompliance

Project management and personnel would not be able to read and understand vital IMS data in order to make timely and reliable management decisions.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm IMS Data Dictionary contains codes that identifies as applicable: Subcontractor activities, EVT (including LOE), risk mitigation activities, CLINS, justification of constraints, leads, lags, and SVTs and other unique text/code information that is unique to the Project
 - a. Document all discrepancies as compliance concerns

Interview Questions

None

6.B Subsection - IMS Structure

The IMS is based on a hierarchical structure with the discrete and optionally LOE activities found at the lowest level being summarized to a Work/Planning Package level through the CA and then to the total project level. There may also be additional summary levels within the IMS if the contractor determines they are needed. Refer to Figure 6.1.

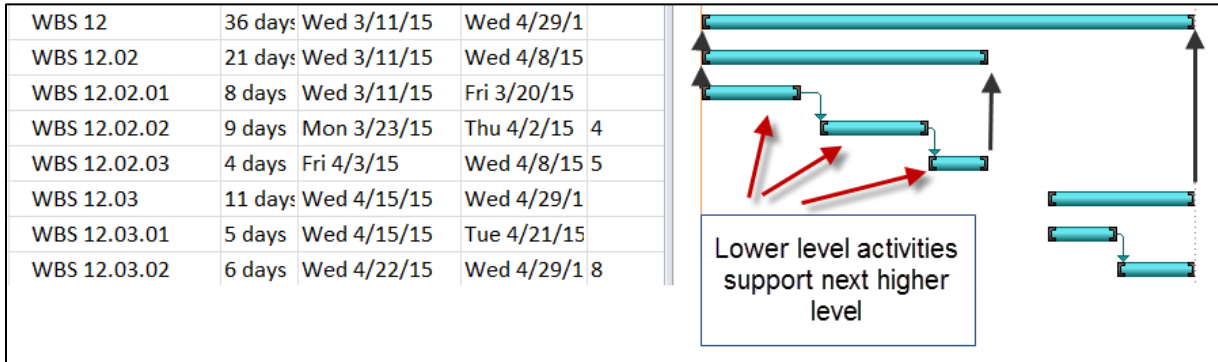


Figure 3 - Schedule Hierarchy

The IMS is also structured to facilitate an easy reconciliation to the project WBS and the contractor's OBS. The lower level activities must support the higher level activities and summary levels in the IMS. This is true for the WBS and OBS rollups. An example of this would be that the lower level activities have start and completion dates inside the PoP of the higher level schedule that lower level schedules support. Refer to Figure 6.2 for a notional representation of three activities supporting a WP.

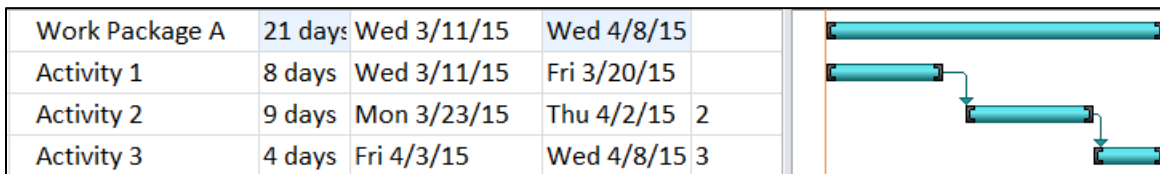


Figure 4 - Activities Supporting a WP

Calendar dates are used for the start and completion dates of activities, milestones, decision points, etc. The IMS must be consistent when using the dates.

While the IMS may contain activities that have an Earned Value Technique (EVT) of level of effort (LOE), there should not be any LOE found on driving paths to an intermediate milestone or the project critical path (CP) since LOE is supportive in nature, has no output or end product and has no schedule variance. To prevent this from occurring, activities coded with an EVT or LOE should not link to or from discrete effort either directly or indirectly. The CP is considered reasonable when there are no

unexplained gaps in time between activities, no activities assigned an EVT of LOE, and activities are tied together in a sequence that makes sense from a workflow standpoint. Activities in the IMS must contain sufficient detail to make it easy to relate them to EVMS WPs. Typically, there are one or more activities in the IMS that support or compose a WP. The coding hierarchy and the start and completion dates help determine if the activities support the WP.

The IMS is expected to have more granularity in the near term with less detail as you move out into the future. The further out in the future you go the less detail the IMS will have. Refer to figure 6.3.

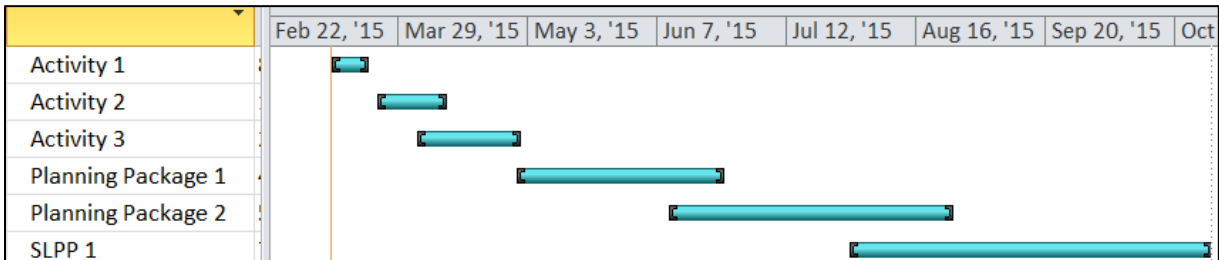


Figure 5 Schedule Granularity

The CP is the longest contiguous sequence of activities from time now to the end of the discrete work in a project. A review of the CP reveals which activities are causing delays in accomplishing the project on time. This analysis helps management focus on these activities to develop workaround plans and seize opportunities that help keep the project deliverable on time. Driving paths are the longest contiguous sequence of activities that determines an intermediate project event or deliverable. There is only one method (Critical Path Method) for calculating the CP and driving paths. The CP and driving paths are used for managing the project as well as reporting to the DOE.

The guideline is further defined by QE LOI shown below.

6.B.1	Does the network schedule/IMS describe the sequence of work (horizontal integration) and clearly identify significant interdependencies that are indicative of the actual way the work is planned and accomplished at the level of detail to support project critical path development?
6.B.2	Is there vertical schedule integration, (i.e., there is consistency of data between various levels of schedules (including subcontractor and field level schedules)) and do all levels of schedules support the project schedule requirements?
6.B.3	Does the schedule contain sufficient detail and clearly link with the EVMS Cost Tool?
6.B.4	Are WPs scheduled consistent with how the effort is planned to be accomplished?
6.B.5	Does the critical path continue for the entire project period of performance of the project?
6.B.6	Is the critical path based on project deliverables?
6.B.7	Are the critical path and driving paths reasonable?
6.B.8	Does the network utilize hard constraints in anything except the end of the IMS, with the exception of Government directed constraints?
6.B.9	Does the network utilize soft constraints minimally, and less than 15% on incomplete activities
6.B.10	Is the schedule broken into short baselined discrete activities in the detailed planning period?
6.B.11	Does the schedule exclude DOE schedule contingency within the period of performance of the PMB?
6.B.12	Are the forecast dates in the ETC for the WP/PPs the same in the IMS and the EVM Cost Tool?
6.B.13	Is schedule effort outside the detailed planning period supported by planning packages and/or Summary Level Planning Packages that are technically based to support a realistic critical path?

Note: All analysis in this section is against the baseline and forecast schedules unless LOI limits to PMB.

QE LOIs Repeated With Discussions

6.B.1 Does the network schedule/IMS describe the sequence of work (horizontal integration) and clearly identify significant interdependencies that are indicative of the actual way the work is planned and accomplished at the level of detail to support project critical path development?

The schedule network is a model of how the project will accomplish the goals and deliverable reflected in the contract. The networked schedule establishes a logical sequence of work that leads through key milestones, events, and/or decision points to completion of project objectives. The granularity of both the baseline and forecast schedule must be sufficient to promote a clear understanding of the work tasking at the work performance level. This means the detailed activities must be planned in a sequence the way they will be worked. All activities in the schedule should have both predecessor and successor relationships, with the exception of logical external receipts or deliveries including the project start and end. These relationships define in what order work will be performed. The Finish to Start (FS) relationship should be used in the vast majority of logic ties in the IMS. In other words when the predecessor task/milestone is complete, the successor task may begin. This makes the schedule logical backwards and forwards. Finish-Finish (FF) and Start-to-Start logic ties if any should be used sparingly, less than 10% of the to-go work. In contrast, Start-to-Finish (SF) relationships (task 1 must start so that task 2 can finish) are very difficult to justify and should be avoided.

A lag is a scheduling technique that causes a delay in a successor activity. A lag functions as an extension of the duration. An example of this would be: the first activity is "pour concrete", and the second activity is "remove the forms surrounding the concrete". Let's assume the concrete needs to cure for five days before the forms can be removed. The schedule relationship between the first activity of pouring the concrete and the successor activity of removing the forms could have a lag of five days to force the second activity to wait until the cure time has passed before removing the forms. Lags are not activities in the schedule and do not have an EVT. There is no work scope associated with a lag and no resources expended during the lag period. The use of lags should be minimized. A lag must never be used to manipulate the schedule dates. Instead a lag must be representative of a missing task such as a DOE required review and approval. A lag can always be represented alternatively as an SVT (see QE LOI 6.A.12). Lags that are longer than 20 working days, which is typically one accounting month, must be justified as to why they are required.

Impact of Noncompliance

Incorrect, excessive, or missing logic links and lags may invalidate the usefulness of the critical path. This would cause artificial variances and the EVMS reporting would be suspect.

Verification Steps

Data Analysis (Automatable)

1. Schedule Analysis Tool (e.g., Fuse): IMS Baseline Schedule Verification – Perform against the baseline schedule to confirm the integrity of the structure of the schedule plan
 - a. $X = \#$ of incomplete discrete activities and milestones without Predecessors and or Successors / $Y = \text{Total } \#$ of incomplete activities and milestones
Pass: $X/Y \leq 5\%$

Fail: $X/Y > 5\%$

- b. $X = \#$ of start-finish (S-F) relationships on incomplete activities and milestones in the IMS schedule
Pass: $X = 0$
Fail: $X > 0$
 - c. $X = \#$ of (SS) and (FF) relationships on incomplete activities and milestones in the IMS schedule / $Y = \#$ of total relationships on incomplete activities and milestones
Pass: $X/Y \leq 10\%$
Fail: $X/Y > 10\%$
 - d. $X = \#$ of lags on incomplete activities and milestones in the schedule / $Y =$ Total incomplete activities and milestones
Pass: $X/Y \leq 5\%$
Fail: $X/Y > 5\%$
 - e. $X = \#$ of lags greater than 20 working days on incomplete activities and milestones
Pass: $X = 0$
Fail: $X > 0$
 - f. $X = \#$ of incomplete activities and milestones with lags in the IMS schedule / $Y =$ Total $\#$ of incomplete activities and milestones
Pass: $X/Y \leq 5\%$
Fail: $X/Y > 5\%$
 - g. $X = \#$ of incomplete activities and milestones with leads in the IMS schedule
Pass: $X = 0$
Fail: $X > 0$
2. Fuse: IMS Forecast Schedule Verification – Perform against the current forecast schedule to confirm the integrity of the structure of the latest plan
- a. $X = \#$ of incomplete discrete activities and milestones without Predecessors and or Successors / $Y =$ Total $\#$ of incomplete activities and milestones
Pass: $X/Y \leq 5\%$
Fail: $X/Y > 5\%$
 - b. $X = \#$ of start-finish (S-F) relationships on incomplete activities and milestones in the IMS schedule
Pass: $X = 0$
Fail: $X > 0$
 - c. $X = \#$ of (SS) and (FF) relationships on incomplete activities and milestones

in the IMS schedule / $Y = \#$ of total relationships on incomplete activities and milestones

Pass: $X/Y \leq 10\%$

Fail: $X/Y > 10\%$

d. $X = \#$ of lags greater than 20 working days on incomplete activities and milestones

Pass: $X = 0$

Fail: $X > 0$

e. $X = \#$ of incomplete activities and milestones with leads in the IMS schedule

Pass: $X = 0$

Fail: $X > 0$

Artifact Traces between Documents

1. Conduct a manual check of lag use and documentation in the schedule.
 - a. Using the IMS Supplemental Guidance, determine the process for use of lags and identification/documentation in the IMS.
 - b. In the forecast IMS, identify lags by selecting an activity and view lag assignments, if any, in the relationship tab, the predecessor tab or in the successor tab. Lags can also easily be identified by exporting relationships to a spreadsheet and filtered for lags. Finally, schedule analysis tools such as Fuse can provide a list of relationships using lags.
 - c. Per the IMS Supplemental Guidance, determine if each identified lag is documented appropriately in the IMS. If longer than 20 working days, is it justified in the IMS? Make sure there is no work scope associated with any lags.
 - d. Document all discrepancies as compliance concerns

Interview Questions

1. Project Controls/CAMs – (If SF, SS, or FF relationships used) please provide justification for these relationships.
2. CAM: (Select a task with a lag) - What is the reason for the lag? What scope does the lag represent? How do you know when to status the lag?

6.B.2 Is there vertical schedule integration, (i.e., there is consistency of data between various levels of schedules (including subcontractor and field level schedules) and do all levels of schedules support the project schedule requirements?

Discussion

Each schedule level must support the next higher level. The activity level supports the WP level which supports the CA level. There may be additional levels which must also be vertically integrated. Detail schedules such as field level schedules are not required to be in the IMS but must also vertically trace to the IMS. Subcontractor schedules must align vertically, regardless of the implementation method chosen to represent them in the IMS. HDV material procurement and delivery information in the IMS must align with information in other sources, such as a material tracking database. Consistency of data means the start and completion dates should be within the same accounting period and within a few days of each other to be considered vertically integrated.

The vertical traceability requirement applies to both the baseline and forecast schedule

Impact of Noncompliance

If lower level schedules do not support the WPs, PPs and project goals and deliverables in the IMS, the project team is working to different schedules, defeating the usefulness of the IMS as a management tool.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify that baseline dates reconcile between schedule levels. This test is within the WBSs and also between summary or subsidiary schedules.
 - a. $X = \#$ of IMS activities and or milestones with baseline start/finish dates outside the higher level project elements baseline start/baseline finish dates depicted at the top level schedule (master) / $Y = \#$ of IMS activities and or milestones selected.
Pass: $X/Y = 0$
Fail: $X/Y > 0$
2. Verify that forecast dates reconcile between schedule levels. This test is within the WBSs and also between summary or subsidiary schedules.
 - a. $X = \#$ of IMS activities and or milestones with forecast start/finish dates outside the higher level project elements forecast start/finish dates depicted at the top level schedule (master) / $Y = \#$ of IMS activities and or milestones selected
Pass: $X/Y = 0$
Fail: $X/Y > 0$
3. Confirm the baseline schedule has been created, named as a baseline (target), and assigned to the forecast schedule.
 - a. Conduct a manual check to ensure the baseline IMS has been assigned to the forecast IMS. (P-6 directions are below may be modified if other tools

are used)

1. Open the forecast (status) IMS and going to the project tab, then selecting Maintain Baseline.
2. The baseline IMS should appear (underneath) as linked to the forecast (status) IMS.
3. On the same screen, check the baseline type for assignment as a project, primary, secondary or tertiary baseline. This selection directs the population of appropriate fields for the BL project, BL1, BL2 or BL3 baseline field values respectively.
4. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: For WPs in CAxx, do the WP descriptions accurately and wholly reflect the scope of work, are activity relationships defined?
2. Project Controls: If subcontract, field, or M/ERP schedule alignment processes have not been identified or handoffs coded in the IMS, how are subcontractor, M/ERP and field level schedules integrated with the IMS?
3. CAM: What is the daily schedule you are working to? Are there detail schedules below the IMS? If so, can you demonstrate vertical traceability to the forecast schedule? How is the work in the lower level detailed schedules addressed in the IMS? At what WP? Are the lower-level detailed schedules used as Quantifiable Backup Data for claiming performance in the IMS? If so, how are the values for performance established and claimed?

6.B.3 Does the schedule contain sufficient detail and clearly link with the EVMS Cost Tool?

Discussion

The schedule must have enough detail to clearly define the steps necessary to accomplish the project objectives. There is no requirement to have a one-to-one relationship between activities and WPs. There may be several activities in the schedule that support one WP. Regardless of the level of detail in the schedule, there must be multiple levels that tie directly to the contractors EVM Cost Tool and EVMS reporting system – WP/PP and CA as a minimum. Linkage is required so that both the start and completion dates are consistent in the IMS and EVM Cost Tool baseline and forecast files. The various management systems and tools the contractor uses must all report the same data.

Sufficient detail has different meaning within the detail planning period and beyond. For example, within the detail planning period it is expected that work is planned to the level at which the work is performed. Work beyond near-term execution is typically, or may be contained in PPs and/or SLPPs at higher levels.

Sufficient detail is also addressed in QE LOI 6.B.10 regarding the average durations which also indicates the fidelity of the plan at the work performance level.

Impact of Noncompliance

Without linkage between the IMS and WPs, management will have erroneous information (one of them has to be wrong) to make decisions. Also, subsystem integration (as discussed in Guideline 3) is brought into question.

Verification Steps

Data Analysis (Automatable)

1. X = Count of incomplete discrete WPs and PPs in the EVM Cost Tool that are not represented in the IMS
Pass: $X = 0$
Fail: $X > 0$

Artifact Traces between Documents

1. Compare CA, WP and PP descriptions in the IMS to the same in the EVMS Cost Tool. The scope should be the same between like-coded elements

Interview Questions

None

6.B.4 Are WPs scheduled consistent with how the effort is planned to be accomplished?

Discussion

The schedule must reflect when the effort is expected to be executed. The start date is when the resources are expected to begin the effort and the completion date is when the completion criteria have been satisfied.

Impact of Noncompliance

Inconsistent progress would lead to inefficient resource expenditures and erroneous schedule status.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

None

Verify the IMS has unique activity names

- a. Sort the schedule by the titles.
- b. Scroll down and verify there the titles are indicative of the work.
- c. if the contractor has provided
- c. Threshold is 0.

Interview Questions

1. CAMs: (Select 2 future discrete activities within a WP) How does the planning of the WP demonstrate physical accomplishment?
2. CAMS (Select 2 in-process activities within a discrete WP) How is physical accomplishment demonstrated?

6.B.5 Does the critical path continue for the entire period of performance of the project?

Discussion

The critical path is a contiguous sequence of activities from the Data Date to a selected end deliverable (Typically the CD-4 complete milestone). There should be no gaps in the relationships (predecessor / successor) between the sequences of activities.

Impact of Noncompliance

An inaccurate critical path focuses project resources on erroneous priorities.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify there is a contiguous critical path from the Data Date through the remaining project PoP (instructions are P-6 specific and may be modified with other schedule tools)
 - a. Using the IMS Supplemental Guidance and process documentation, confirm the process and verify the end project milestone used to run the Critical Path

- for the project.
- b. Run the Critical Path.
 - c. Compare the contractor-provided critical path with the schedule driven critical path (longest path definition)
 1. In the forecast IMS, go to Tools, Schedule.
 2. Select "Options".
 3. Define Critical Activities as the longest path.
 4. Go to the "Advanced" tab, and select Calculate multiple float paths, as desired.
 5. Calculate multiple paths using Free Float.
 6. Select the end of project milestone (typically the contractor CD-4 complete milestone). Some schedules may include post-CD-4 sustainment effort, which is usually not discrete and should not be counted as part of the critical path
 7. Select the "Browse" button to choose the end activity or milestone, as designated in the IMS Supplemental Guidance.
 8. Identify the number of paths to calculate (typically at least 3, but may be 10 or more), then close the Schedule Options tab.
 9. Select the "Schedule" button to recalculate.
 10. Set up a Critical Path layout by Grouping on Float Path, then by Float Path Order. Include columns as required to evaluate the activities on the float paths. These columns typically include Activity ID, Activity Name, Start, Finish, Duration, Total Slack, CAM, CA, WP, among others.
 11. Scroll down visually and look for gaps, if any that are significant. There should be none.
 12. Compare the published or coded Critical Path with the generated Critical Path.
 13. Identify any discrepancies between the Critical Paths. Float Path 0, the most critical path, should stretch from the schedule data date to the end of the project.
 14. Given the differences in settings, document all discrepancies as compliance concerns

Interview Questions

1. Project Controls: If no Critical Path process is outlined in the IMS Supplemental Guidance or process documentation, ask how consistency of the Critical Path process is maintained?
2. Project Controls: How are changes to the Critical Path reported to the customer? How often?

6.B.6 Is the critical path based on project deliverables?

Discussion

The project CP is calculated using a milestone that represents the completion of discrete work on the project. Typically this is the contractor's CD-4 milestone in the project schedule. Any path developed other than to the end of the project is identified as a driving path. Because there is occasional LOE work after a final milestone (sustainment, closeout paperwork, etc.) care must be used to identify the specific end of the discrete effort in the IMS CP calculations.

Impact of Noncompliance

Without defining the end point, the critical path is not logical.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the critical path based on project deliverables, as calculated
 - a. Using the PEP and the SOW and the calculated critical path, confirm the location of documented project completion milestone as the basis for the calculation of the critical and near critical paths. Verify the end point (CD-4) is constrained to calculate float.
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

6.B.7 Are the critical path and driving paths reasonable?

Discussion

The critical path is the longest contiguous sequence of activities from time now to the end of the discrete work in the project. If an activity on the critical path slips, the forecasted project end date should slip. A driving path is the longest sequence of activities from time now to an interim project milestone, event or deliverable. If an activity on a driving path slips, the forecasted project interim milestone event or deliverable should slip. This LOI focuses on reasonableness of the critical path or driving paths. Reasonableness means there should be a network with logical relationships that accurately reflect the flow of discretely measureable work being executed. The paths should not contain the EVM EVT LOE since LOE is supportive in nature and has no output or end product and no schedule variance. Contiguous means there are no unexplained gaps in time between activities or the use of lags. Excessive float may impact the paths and indicate missing or

inappropriate relationships in the network. Additionally, management (at least the CAMs and PM) should concur with the critical and driving paths based on their technical expertise. This concurrence may be documented in an email, meeting minutes or other format as long as it is documented. Also see QE LOI 6.C.4 for a discussion on the approval process for the overall IMS.

Impact of Noncompliance

Unreasonable critical paths or driving paths do not provide the insight necessary for management to focus on the correct activities to prevent the project end date from slipping the schedule.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the forecast schedule tool produces a critical path that represents the longest total duration with the least amount of float (“Total Float”) with the Push Test.
 - a. The CP begins at “time now” and proceeds to project completion, based on project deliverables, with activities and milestones tied together with sound network logic.
 - b. The path contains no LOE EVT.
 - c. There are no unexplained gaps in time between activities, such as inappropriate lags representing non-PMB effort.
 - d. Complete a push test to determine the activities that are on the predecessor path to the end milestone ((A push test is copying the file and adding 500 days to a discrete near term task. This should slip the end date between 450-500 days if the network is logical)).
 1. Move to the forecast IMS, apply a hard constraint to the end milestone if not already constrained. Do not use the P6 Mandatory Finish constraint as it will break logic to maintain the assigned date. Use Finish On or before instead.
 2. Select a constraint date 500 days earlier than the planned finish date.
 3. Select Tools/Schedule then Schedule to recalculate the schedule.
 4. Activities on the predecessor path will now have extreme negative float while other activity float values will not change. The expectation is that critical work will have up to 500 days negative float (actual value depends on the working calendar)
 - e. Repeat the push test for Successor Activities to the end milestone
 - f. Save the schedule log to review settings and any errors
 - g. Compare the activities on the IMS identified critical path to the critical path calculated using push test results
 - h. The expectations are that the end task that is constrained now has between 450 and 500 days negative float. Any significant difference is investigated

- for logic inconsistencies.
- i. Document all discrepancies as compliance concerns
2. Verify the forecast schedule tool produces a critical path that represents the longest total duration with the least amount of “Total Float” with the Pull Test.
 - a. The CP begins at “time now” and proceeds to project completion, based on project deliverables, with activities and milestones that are tied together with sound network logic.
 - b. The path contains no LOE EVT.
 - c. There are no unexplained gaps in time between activities, such as inappropriate lags representing non-PMB effort.
 - d. Complete a pull test to determine the activities that are on the predecessor path to the end milestone (A pull test is copying the file and adding 500 days to a discrete predecessor of the constrained end task.).
 1. Move to the forecast IMS, apply a hard constraint such as Mandatory Finish to the end milestone if not already constrained.
 2. Select a constraint date 500 days later than the planned finish date.
 3. Select Tools/Schedule then Schedule to recalculate the schedule.
 4. Activities on the predecessor path will now have extreme negative float while other activity float values will not change. The expectation is that critical work will have up to 500 days negative float (actual value depends on the working calendar)
 - e. Repeat the push test for Successor Activities to the end milestone
 - f. Save the schedule log to review settings and any errors
 - g. Compare the activities on IMS identified critical path and critical path calculated using push test results
 - h. The expectations are that the early discrete task near time now have between 450 and 500 days negative float. Any significant difference is investigated for logic inconsistencies.
 - i. Document all discrepancies as compliance concerns
 3. Verify the baseline schedule tool produces a critical path that represents the longest total duration with the least amount of float (“Total Float”) with the Push Test
 - a. The CP begins at “time now” and proceeds to project completion, based on project deliverables, with activities and milestones tied together with sound network logic.
 - b. The path contains no LOE EVT.
 - c. There are no unexplained gaps in time between activities, such as inappropriate lags representing non-PMB effort.
 - d. Complete a push test to determine the activities that are on the predecessor path to the end milestone (A push test is copying the file and adding 500 days to a discrete near term task.)
 1. Move to the baseline IMS, apply a hard constraint such as Mandatory Finish to the end milestone if not already constrained.
 2. Select Tools/Schedule then Schedule to recalculate the schedule.
 3. Activities on the predecessor path will now have extreme negative float while other activity float values will not change. The expectation is that

- critical work will have up to 500 days negative float (actual value depends on the working calendar)
- e. Repeat the push test for Successor Activities to the end milestone
 - f. Save the schedule log to review settings and any errors
 - g. Compare the activities on IMS identified critical path and critical path calculated using push test results
 - h. Document all discrepancies as compliance concerns
4. Verify the baseline schedule tool produces a critical path that represents the longest total duration with the least amount of float (“Total Float”) with the Pull Test).
- a. The CP begins at “time now” and proceeds to project completion, based on project deliverables, with activities and milestones are tied together with sound network logic.
 - b. The path contains no EVM EVT level-of-effort (LOE).
 - c. There are no unexplained gaps in time between activities, such as lags representing non-PMB effort.
 - d. Complete a pull test to determine the activities that are on the predecessor path to the end milestone (A pull test is copying the file and adding 500 days to a discrete predecessor of the constrained end task. This should slip the end date between 450-500 days if the network is logical).
 1. Move to the baseline IMS, apply a hard constraint such as Mandatory Finish to the end milestone if not already constrained. Do not use the P6 Mandatory Finish constraint as it will break logic to maintain the assigned date. Use “Finish On or Before” as a better alternative. Select a constraint date 3 years earlier than the planned finish date.
 2. Tools/Schedule then Schedule to recalculate the schedule.
 3. Activities on the predecessor path will now have extreme negative float while other activity float values will not change. The expectation is that critical work will have up to 1000 days negative float (actual value depends on the working calendar)
 - e. Repeat the push test for Successor Activities to the end milestone
 - f. Save the schedule log to review settings and any errors
 - g. Compare the activities on IMS identified critical path and critical path calculated using push test results
 - h. The expectations are that the early discrete task near time now has between 450 and 500 days negative float. Any significant difference is investigated for logic inconsistencies.
 - i. Document all discrepancies as compliance concerns
5. Verify the schedule tool produces a driving path to the next interim milestone that represents the longest total duration with the least amount of float (“Total Float”).
- a. This driving path begins at “time now” and proceeds to the next interim milestone, based on project deliverables, with activities and milestones tied together with sound network logic.
 - b. The path contains no EVM EVT for level-of-effort (LOE).
 - c. There are no unexplained gaps in time between activities, such as lags

- representing non-PMB effort.
- d. Complete a push test to determine the activities that are on the predecessor path to the next interim milestone
 1. In the forecast IMS, apply a hard constraint such as Mandatory Finish to the next interim milestone
 2. Select a constraint date 3 years earlier than the planned finish date.
 3. Tools/Schedule then Schedule to recalculate the schedule.
 4. Activities on the predecessor path will now have extreme negative float while other activity float values will not change.
 - e. Repeat the push test for Successor Activities to the next interim milestone
 - f. Save the schedule log to review settings and any errors
 - g. Identify any gaps in the driving path.
 - h. Document all discrepancies as compliance concerns
6. Verify that management has approved both the critical and driving paths in the schedule based on their technical expertise.
- a. Look for written schedule critical paths approval documentation (email, meeting minutes, etc.) by the CAMs and PM.
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

6.B.8 Does the network utilize hard constraints in anything except the end of the IMS, with the exception of Government directed constraints?

Discussion

Hard constraints prevent logic in the network from driving the schedule. An activity may slip, but the impact of the slip will not be accurately reflected if a hard constraint is restricting the movement of other related activities in the schedule network. The project end date requires a hard constraint to calculate float values and run a critical path.

In P6 the following are considered hard constraints:

- Mandatory Start or Finish
- Finish or Start On or Before
- Start or Finish On

All use of hard constraints, if any, should be justified in a text field in the IMS and defined in the IMS Data Dictionary.

Of special note is the mandatory constraint type. This constraint is designed to break logic to achieve its assigned date, negating its effect on float. So it is recommended to avoid the mandatory constraints.

Impact of Noncompliance

Hard constraints do not allow the schedule network to drive the schedule and accurately represent the impacts of schedule slips.

Verification Steps

Data Analysis (Automatable)

1. Fuse: $X = \#$ of incomplete forecast activities and milestones with "hard" constraints applied as Primary Constraints / $Y =$ "hard" constraint on end milestone
Pass: $X/Y = 1$
Fail: $X/Y > 1$
2. Fuse: $X = \#$ of incomplete forecast activities and milestones with "hard" constraints applied as Secondary Constraints / $Y =$ "hard" constraint on end milestone
Pass: $X/Y = 0$
Fail: $X/Y > 0$

Artifact Traces between Documents

1. Verify justifications on hard constraints used in the IMS
 - a. Review IMS supplemental guidance on the use of hard constraints
 - b. Filter for hard constraints in the baseline schedule
 1. Review justifications on each activity regarding the use of the constraint
 2. Was the proper constraint used? Are the circumstances for its use still in place?
 - c. Filter for hard constraints in the baseline schedule
 1. Review justifications on each activity regarding the use of the constraint
 2. Was the proper constraint used? Are the circumstances for its use still in place?
 - d. Perform checks to verify constraints are not used in both the primary and secondary date constraints to create a hard constraint
 - e. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: Investigate why CAM used a hard constraint.

6.B.9 Does the network utilize soft constraints minimally, and less than 15% on incomplete activities?

Discussion

Soft constraints are defined as constraints that affect the early pass of the schedule. In other words they inhibit activities from moving closer in time based on status. Soft constraints in P6 are defined as:

Start and Finish After,
As Late as Possible

Soft constraints are most commonly used to model resource constraints. Normally they should be justified and less than or equal to 15% of the incomplete activities.

Additionally soft constraints should be justified if placed on activities 20 working days or more in the future. This requirement is also in the IPMR DID and based on the fact that the knowledge of resource conflicts in the far future is unusual. Justification could be internal to the IMS or external, although should be provided or referenced as appropriate to review teams verifying compliance with this QE LOI.

Impact of Noncompliance

Soft constraints interrupt the network logic based on status. In excess, they destroy a part of the predictability of the IMS.

Verification Steps

Data Analysis (Automatable)

1. Fuse: $X =$ Incomplete activities and milestones in the baseline with soft constraints that prevent the early start of a task/ $Y =$ total incomplete activities and milestones
 - a. Tolerance $\leq 15\%$
2. Fuse: $X =$ Incomplete activities in the forecast with soft constraints that prevent the early start of a task/ $Y =$ total incomplete activities
 - a. Tolerance $\leq 15\%$

Interview Questions

None

6.B.10 Is the schedule broken into short baselined discrete activities in the detailed planning period?

Discussion

Visibility for good planning is highest closest to the data date. Farther out into the future, less information may be available and specific information to help CAMs plan activities in more detail may not be available. Planning in the near term is expected to be

clear and detailed in short activities (no longer than 20 working days in duration) so that effort required to perform the task and completion criteria is very easy to understand. Planning beyond the near term may be less detailed, usually assigned to PPs, but still in support of project milestones and deliverables. For many projects the fiscal year may be the planning horizon. Scope that has not yet been authorized to a CA (SLPPs) may also be in the schedule farther beyond must be in support of project milestones and deliverables just like PPs. All the activities, including those assigned to PPs and SLPPs must have predecessor /successor relationships as they are part of the schedule network and potentially on the critical path.

Impact of Noncompliance

The lack of near term detail planning creates a baseline schedule that will not produce an accurate critical path leading to erroneous priorities.

Verification Steps

Data Analysis (Automatable)

1. $X = \text{Remaining baseline discrete activities with duration} > 20 \text{ working days} / Y = \text{Total \# of discrete activities (excludes LOE EVT, Milestones, GFE/GFI/GFM or external DOE requirements, Schedule Margin, PP and SLPP)}$
 - a. Tolerance $\leq 5\%$

Artifact Traces between Documents

1. Examine the IMS PPs and SLPPs for supporting the critical path
 - a. Using the IMS Dictionary, identify PPs in the IMS
 - b. Examine if the planning package is discrete
 - c. Are logical relationships between PPs and discrete WPs present?
 - d. Are logical relationships between discrete PPs logically linked?
 - e. Are planning package activities within the current period or the freeze period as defined by the Contractor's EVM SD?
 - f. Repeat for discrete SLPPs if any.
 - g. Document all discrepancies as compliance concerns

Interview Questions

None

6.B.11 Does the schedule exclude DOE schedule contingency within the period of performance of the PMB?

Discussion

DOE schedule contingency is outside the schedule baseline. The IMS reflects the schedule dates on contract for the project which do not include schedule contingency.

Note – there is no EVMS requirement to have DOE schedule contingency in the contractor’s IMS.

Impact of Noncompliance

The contractor has developed a plan that has a high risk of missing the contractually required dates of the project.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify that DOE Contingency is not shown as part of the PMB.
 - a. Check the IMS Supplemental Guidance regarding any DOE Contingency representation in the IMS.
 - b. Conduct a manual search of the activity descriptions in the baseline and forecast IMS to identify any DOE Contingency activities.
 - c. If any activities are identified, ensure they have no resources assigned.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

6.B.12 Are the forecast dates in the ETC for the WP/PPs the same in the IMS and the EVM Cost Tool?

Discussion

The IMS is an important component of an integrated EVMS of tools and processes. One of its primary responsibilities is to forecast the future starts and completions of work based on the latest updates from the management team. This information is the basis for actual starts and finish dates as well as the forecast starts and completions of the WPs, PPs, CAs and SLPPs in the EVM Cost Tool.

Impact of Noncompliance

Without the integration and alignment of forecast IMS and EVM Cost Tool dates, both systems may report contradictory information, causing confusion in the management team, potentially leading to poor decisions.

Verification Steps

Data Analysis (Automatable)

1. Verify forecast date alignment between the IMS and the EVM Cost Tool for WP, PP and CA.
 - a. Compare start dates for WPs and PPs: X = differences between IMS forecast early start/actual start date in open or future WPs or PPs shared by both systems. Date differences that are within the same accounting period are OK.
Pass: $X = 0$
Fail: $X > 0$
 - b. Compare finish dates for WPs and PPs: X = differences between IMS forecast early finish date in open or future WPs or PPs shared by both systems. Date differences that are within the same accounting period are OK.
Pass: $X = 0$
Fail: $X > 0$
 - c. Compare start dates for CAs: X = differences between IMS forecast early start/actual start date in open or future CAs shared by both systems. Date differences that are within the same accounting period are OK.
Pass: $X = 0$
Fail: $X > 0$
 - d. Compare finish dates for CAs: X = differences between IMS forecast early finish date in open or future CAs shared by both systems. Date differences that are within the same accounting period are OK.
Pass: $X = 0$
Fail: $X > 0$

Artifact Traces between Documents

None

Interview Questions

None

6.B.13 Is schedule effort outside the detailed planning period supported by planning packages and/or Summary Level Planning Packages that are technically based to support a realistic critical path?

Discussion

Paired with the need to have good near-term detail planning (QE LOI 6.B.12) is the importance of a sound, technically-based long term plan to the end of the project. While not as much information is available to the CAMs to accurately detail the work required in

the future, the level of schedule information should be adequate to plan at a level sufficient to provide impacts to project milestones and deliverables. The exit completion criteria of these far-term activities should be based on technical achievement, not on date-based scope (date based examples such as FY 19 design, FY 20 construction, etc. are not permitted) Typically these longer term activities are assigned to PPs, however, SLPPs are available for work not yet assigned to a CA. Together with activities in WPs, PPs and SLPPs the data should be able to support the development of realistic driving paths to selected project milestones and a project critical path.

Impact of Noncompliance

The lack of long term planning at a sufficient level of detail creates a baseline schedule that does not produce an accurate critical path leading to erroneous priorities.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Examine the IMS PPs and SLPPs for supporting the critical path
 - a. Using the IMS Dictionary, identify PPs and SLPPs in the IMS
 - b. Examine if the planning package is intended to be discretely measured when detail planned into WPs
 - c. Evaluate the PP and SLPP descriptions in the IMS code Dictionary. Do they also indicate technical achievement associate with the PP and SLPP? Do the descriptions match the descriptions for the same element in the EVM Cost Tool?
 - d. Are the activity names in the PPs and SLPPs indicative of technical effort to be accomplished?
 - e. Are logical relationships between PPs and discrete WPs present?
 - f. Are logical relationships between discrete PPs logically linked?
 - g. Document all discrepancies as compliance concerns

Interview Questions

None

6.C Subsection - IMS Validity

The baseline schedule represents the EVMS plan that has been established as an accurate model of the way the work scope will be executed. The forecast schedule is statused (typically monthly) to report progress (BCWP) against the baseline and also used to forecast future activity up to and including project completion. For the IMS to produce meaningful results, the schedule must represent all work required to perform the scope of the project, the activities must have durations based upon the scope and resources required to perform the work, and all logical relationships must have assigned predecessors and successors to complete the integrity of the network of activities.

To help model the schedule to real life impacts, several options are available in the scheduling toolset. One option, lags, are available to offset time between activities and milestones in the schedule network. However, lags, especially negative lags which are counter to the flow of time, are strongly discouraged as they may impact the accuracy of the critical path. Constraints place restrictions on either start or finish dates of activities and may impact the critical path accuracy as well. The schedule should be relatively free from constraints allowing the network to reflect accurate schedule impacts. Constraints are useful to hold the project end date in place, but when used elsewhere, the critical path may be distorted. A single constraint placed on the end DOE deliverable will facilitate the development of a critical path, and allow accurate calculations of dates and float in the schedule.

Since CAMs are responsible for the work scope, schedule, and budget within their respective CAs, they are expected to approve their portions of the IMS. Similarly, the PMs are responsible for the overall project and expected to approve the entire IMS. The IMS is a useful tool for helping management prioritize work. Regular project meetings for this purpose are generally recognized as a good practice. Total float is the amount of time an activity can slip before the project end deliverable is impacted. Generally, float greater than 44 working days is considered high and raises the question whether the activity is linked to an appropriate successor.

The guideline is further defined by QE LOI shown below.

6.C.1	Does the baseline schedule contain only positive or zero total float, unless driven by factors outside the project?
6.C.2	Does the schedule provide baseline, actual and current forecast dates, durations, and relationships as required for all activities?
6.C.3	Do LOE activities, if included in the IMS, NOT impact any discrete work?
6.C.4	Are required IMS approvals by the CAMs/PMs demonstrated?
6.C.5	Is the IMS total float reasonable?
6.C.6	Do CAMS/PMs use the IMS as a tool to prioritize the work?

QE LOIs Repeated With Discussions

6.C.1 Does the baseline schedule contain only positive or zero total float, unless driven by factors outside the project?

Discussion

Float is the amount of time an activity can slip without impacting the project end date. Activities with negative float indicate an inability to meet project delivery dates or Critical Decision milestones. Negative float is only created by slips to a milestone or activity constraint being impacted. Baseline plans are developed to support the contractual delivery dates which means there should be no negative float values in the baseline schedule.

On occasion, factors outside the control of the contractor, or the DOE, may influence a decision to baseline some elements of the IMS to negative float. For example, if a state government establishes an unachievable milestone date that has been since overcome by events. These very rare exceptions should be communicated by the Contractor to DOE prior to the establishment of negative float in the baseline.

Impact of Noncompliance

A project that has a baseline schedule with negative float represents a plan that is unachievable.

Verification Steps

Data Analysis (Automatable)

1. Fuse: Review the IMS for any baseline plan activities that have negative Total Float.
 - a. $X =$ Count of Baseline plan activities and milestones with negative Total Float
Pass: $X = 0$
Fail: $X > 0$
2. Fuse: Review the IMS for any forecast plan activities that have negative Total Float.
 - b. $X =$ Count of Forecast plan activities and milestones with negative Total Float
Pass: $X > (10)$ days
Fail: $X < (10)$ days

Artifact Traces between Documents

None

Interview Questions

1. PM: what are the specific causes of negative float in the baseline plan? What action or actions are you taking to address the impacts of the negative float and

keep the project on schedule?

6.C.2 Does the schedule provide baseline, actual and current forecast dates, durations, and relationships as required for all activities?

Discussion

The project schedule is one of the most important tools used in the management of a project. The entire work scope is planned out in the schedule baseline in support of project requirements. Progress is measured against the baseline schedule and planned start and completion dates are documented in the forecast schedule. Forecasts are based on progress are made on the activities in the schedule. All changes to the schedule remaining duration, dates, or relationships are made if required to make a realistic go forward schedule.

Impact of Noncompliance

A schedule that lacks a baseline, forecast dates is unable to produce enough information for management to make informed decisions.

Verification Steps

Data Analysis (Automatable)

1. Fuse: $X =$ Count of incomplete activities and start milestones in the forecast schedule without a baseline start date in the IMS
Pass: $X = 0$
Fail: $X > 0$
2. Fuse: $X =$ Count of incomplete activities and finish milestones in the forecast schedule without a baseline finish date in the IMS/ $Y =$ Count of total incomplete activities and finish milestones in the forecast schedule.
Pass: $X \leq 5\%$
Fail: $X > 5\%$
3. Fuse: $X =$ Count of incomplete activities and start milestones in the baseline without a forecast start date in the IMS
Pass: $X = 0$
Fail: $X > 0$
4. Fuse: $X =$ Count of incomplete actual and finish milestones without a forecast finish date in the IMS
Pass: $X = 0$
Fail: $X > 0$

5. Fuse: Compare the forecast schedule this month to the prior 2 months.
Examine the following:
 - a. X = Change in activity durations between two months schedules
Pass $X = 0$
Fail $X > 0$

6. Fuse: Compare the forecast schedule this month to the prior 2 months.
Examine the following:
 - a. X = Change in activity total float between two months schedules
Pass $X = 0$
Fail $X > 0$

7. Fuse: Compare the forecast schedule this month to the prior 2 months.
Examine the following:
 - a. X = Change in activity early finish dates between two months schedules
Pass $X = 0$
Fail $X > 0$

8. Fuse: Compare the baseline schedule this month to the prior 2 months.
Examine the following:
 - a. X = Change in activity durations between two months schedules
Pass $X = 0$
Fail $X > 0$

9. Fuse: Compare the baseline schedule this month to the prior 2 months.
Examine the following:
 - a. X = Change in activity total float between two months schedules
Pass $X = 0$
Fail $X > 0$

10. Fuse: Compare the baseline schedule this month to the prior 2 months.
Examine the following:
 - a. X = Change in activity early finish dates between two months schedules
Pass $X = 0$
Fail $X > 0$

Artifact Traces between Documents

None

Interview Questions

None

6.C.3 Do LOE activities, if included in the IMS, NOT impact any discrete work?

Discussion

There is no requirement that LOE activities be in the project IMS. However, if included, LOE activities are never linked as a predecessor or successor to discrete activities. If LOE is in the IMS, ensure the relationships are appropriate and not tied to discrete activities.

Impact of Noncompliance

Activities assigned the LOE EVT on the critical path mask project performance.

Verification Steps

Data Analysis (Automatable)

1. X = # of LOE activities on the critical path
Pass: X = 0
Fail: X > 0

2. X = Activities with LOE EVT with TF <= 0 days
Pass: X = 0
Fail: X > 0

Artifact Traces between Documents

1. Look for LOE activities linked with discrete effort in the baseline schedule
 - a. Open the Schedule baseline file
 - b. Filter for activities assigned and EVT of LOE
 - c. Open the relationship tab in the bar chart view
 - d. Examine predecessor and successor activities for discrete activities – there should be no links between LOE and discrete activities, including through milestones.

2. Look for LOE activities linked with discrete effort in the forecast schedule
 - a. Open the Schedule baseline file
 - b. Filter for activities assigned and EVT of LOE
 - c. Open the relationship tab in the bar chart view
 - d. Examine predecessor and successor activities for discrete activities – there should be no links between LOE and discrete activities, including through milestones.

Interview Questions

None

6.C.4 Are required IMS approvals by the CAMs/PMs demonstrated?

Discussion

CAMs are responsible for accomplishing the scope of work in the CA. The IMS is the official project plan, documenting the CAMs' plan for accomplishing the work scope and the current and cumulative status for work accomplished. CAMs approve their respective portions (CAs) of the IMS. Likewise, PMs are responsible to the entire project and therefore approval of the project IMS is the responsibility of the PM. This approval serves as a declaration that the person responsible for the CA or project approves the status, endorses the plan and recognizes their responsibility to execute the plan as established. For DOE, the IMS is required when EVM is required and is submitted monthly as part of the Integrated Performance Management Report (IPMR) or with the Contract Performance Report (CPR). The CAMs and PM must approve the monthly IMS before it is submitted to DOE. The approval is typically found on a CA plan or baseline schedule document.

Impact of Noncompliance

Without the appropriate approvals, there is no evidence the person responsible for the CA or project has reviewed or approved the IMS or has taken ownership of their area of responsibility.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor's EVM SD and procedures (if applicable) to determine the monthly IMS review and approval process.
 - a. Review the IMS documentation for signed and dated approvals by the CAMs and PM.
 - b. Document all discrepancies as compliance concerns

Interview Questions

1. Project Manager: What is the review and approval process for the IMS? Is it demonstrable?

6.C.5 Is the IMS total float reasonable?

Discussion

Excessive total float (typically greater than 44 working days in the baseline schedule, 60 days in the forecast) in a schedule is an indication of inappropriate or missing relationships between activities. In other words, an activity may have been linked to the

wrong successor. Generally, when there is excessive float, several activities are found to have a common successor such a project completion which is a couple years away. While convenient, this successor is not likely to be the most appropriate logic tie and has created high float values. The litmus test here is the question: Can this activity slip “X” days (where “X” is the float value), and not impact anything in the project? Often times this question can be answered intuitively to provide guidance to a reasonable float value.

Impact of Noncompliance

High or excessive float may be an indication of a schedule network that is not adequately defined or does not have accurate relationships between activities. This produces a work flow that may not be feasible and an inaccurate critical path.

Verification Steps

Data Analysis (Automatable)

1. Fuse: $X =$ Incomplete baseline discrete activities in the baseline schedule with Total Float > 44 working days / $Y =$ Total # of incomplete discrete activities in baseline schedule
Pass: $X/Y \leq 10\%$
Fail: $X/Y > 10\%$
2. Fuse: $X =$ Incomplete discrete activities in the forecast schedule with Total Float > 60 days / $Y =$ Total # of incomplete discrete activities in forecast schedule
Pass: $X/Y \leq 10\%$
Fail: $X/Y > 10\%$

Artifact Traces between Documents

1. Verify that the baseline network end is constrained.
 - a. In the IMS, find the CD-4 milestone or the latest CD gate baselined. Is the milestone constrained with a hard constraint?
 - b. Tolerance is 0.
2. In the IMS, find the CD-4 milestone or the latest CD gate baselined.
 - a. Is the milestone constrained with a hard constraint?
 - b. Tolerance is 0.
3. Verify that the forecast network end date is constrained
 - a. In the IMS, find the CD-4 milestone or the latest CD gate baselined. Is the milestone constrained with a hard constraint?
 - b. Tolerance is 0.

Interview Questions

1. CAM: (Select two discrete activities with high float – preferably greater than 100 days). Why this task required to be planned on that date? Why can it not slip X days (where X is the excessive float value)?

6.C.6 Do CAMS/PMs use the IMS as a tool to prioritize the work?

Discussion

This QE LOI is related to 6.C.5. The purpose of schedule float is to prioritize the resource. By having reasonable float (6.C.5), then float will change with status. The critical path may change on the project as near critical paths slip more than the critical path. Schedule float is that indicator. Schedule float that is the least (negative or closest to 0) indicates the activities based on status that are now the most critical to complete to maintain the overall critical path. Projects should look at the schedule float changes weekly or monthly as appropriate to understand the work prioritization. Also changes in excessive positive schedule float may indicate a broken link that needs to be fixed.

Impact of Noncompliance

If CAMs are not using the IMS to prioritize their work, resource conflicts may result, inefficiencies may increase, and project goals may not be achieved.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

None

Interview Questions

1. Project Manager/CAM: How do you and the CAMs use the IMS as a tool to prioritize the work?
2. CAMs: If other tools, besides the IMS, are used to prioritize your work, how do these integrate with the IMS? Are changes in float reviewed monthly or weekly? How?

6.D Subsection - IMS Status

Discussion

Schedules are statused at least monthly and more often if the project manager (PM) decides to do so. This provides a consistent reporting period that the contractor submits to the DOE. The status date reflects when the status was determined and is the departure point for the schedule forecast. The baseline and status schedules are closely related as the status schedule was first derived from the baseline schedule. Project status must be easily reconciled to the baseline schedule in order to measure progress to the baseline. If there are significant differences between the two schedules, there is a question regarding the accuracy of the status as well as the forecast.

When the IMS is statused, float values may change and significant changes alert management to areas that may require attention. To ensure consistent reporting of progress (BCWP) and actual costs (ACWP), the month-end accounting period (commonly referred to as the cost processor date) must coincide with the schedule reporting period (schedule status date or Data Date). Completion criteria must be very clear. An example of this would be using activity names to describe completion criteria such as; "complete soil compaction test number one". Frequently, subcontractors represent a significant portion of the project. If this were the case, subcontractor schedules must be an integral part of an IMS. The accuracy of these schedules is critical and the CAM or supply chain manager responsible for oversight of the subcontractor must review and approve these schedules.

The guideline is further defined by QE LOI shown below.

6.D.1	Does the schedule provide actual status including start and completion dates consistent with the status date for all discrete authorized work?
6.D.2	Is the current schedule (actual, forecast dates and progress measurement) compared to the schedule baseline for measuring progress?
6.D.3	Is the IMS status data date consistent with the EVM Cost Tool month-end date?
6.D.4	Has the prime contractor CAM reviewed and approved the subcontractor's schedule status and is it accurately reflected in the Prime's IMS?
6.D.5	Are significant changes in float values reviewed by management?
6.D.6	Are the workaround plans reflected in the forecast schedule, planned in such a manner to support a realistic critical path?
6.D.7	Are forecast schedule workaround plans that changed relationships as compared to the baseline logically reviewed, with concurrence by CAMs, other affected organizations and PMs?
6.D.8	For activities without a baseline, are they designated as ETC only in the title or a code field?

QE LOIs Repeated With Discussions

6.D.1 Does the schedule provide actual status including start and completion dates consistent with the status date for all discrete authorized work?

Discussion

When the IMS is statused in accordance with the business cycle (no less than monthly), the process includes setting the status date (also known as the data date) to be the end of the reporting period. This will move the forecast of the remaining work to be completed to the right of the status date. There should not be activities that have not been started prior to the data date, nor should there be actual start and/or actual finish dates after the data date. Additionally, activities should not be statused out of sequence based on the status of their predecessors. For example, a predecessor should be completed before a successor activity with a FS relationship should start. In reality, if the successor does start out of sequence, then the relationship is overcome by events and should be deleted in the status file and replaced with a meaningful predecessor and successor for each task.

Impact of Noncompliance

If the status date is not consistent with the status period, the schedule is not reporting accurate information.

Verification Steps

Data Analysis (Automatable)

1. Fuse: $X = \#$ of activities with % Physical Percent Complete = 100 % with no actual finish dates
Pass: $X = 0$
Fail: $X > 0$
2. Out of Sequence activities (OOS). A list of statused out-of-sequence activities is available in the P6 scheduling log or an Acumen Fuse report.
 - a. The threshold for OOS is zero. All OOS relationships should be addressed before the results of a scheduling analysis can be accepted for use.
3. Fuse: Unstating activities – once an activity has been statused, it should not return to a former status state in a later reporting period. For example, when an activity is statused as complete, it should not be declared incomplete the next period.
Pass $X = 0$ changes
Fail $X > 0$ changes

Artifact Traces between Documents

1. Determine the number activities with Physical % Complete > 0 with no actual

start dates

Pass: $X = 0$

Fail: $X > 0$

2. Determine the number of activities with Physical % Complete = 100 % with no actual finish dates
Pass: $X = 0$
Fail: $X > 0$
3. Obtain the schedule log from the most recent update, and verify if schedule errors exist with regard to data date inconsistencies or other schedule errors.
 - a. $X =$ # of schedule errors identified in the schedule log / $Y =$ Total # of incomplete activities and milestones
 - b. Tolerance = $< 5\%$
4. Compare forecast and baseline schedule for last three months. Look for excessive changes in durations, relationships, activities month by month to see the schedule stability. This check will result in additional follow-up questions if any concerns are found.

Interview Questions

1. CAM: Have you had to reverse a previously reported status of a scheduled activity?
2. Planning and Scheduling: What are the processes for addressing schedule errors? Are schedule errors addressed before closing out the monthly delivery file?

6.D.2 Is the current schedule (actual, forecast dates and progress measurement) compared to the schedule baseline for measuring progress?

Discussion

The baseline schedule contains all the activities supporting the authorized project work scope. This includes assignment of EVT's for measuring progress. When the development of the baseline schedule is complete and approved, it is copied to create the forecast schedule. Only approved changes, using the contractor's change management process, are updated in the baseline schedule and reflected in the forecast schedule. The forecast schedule is statused with actual start and finish dates, and percent completes tied to physical/technical progress. The progress information is compared to the baseline schedule to provide performance measurements which is the basis of BCWP calculations in the EVM Cost Tool.

The other aspect to this QE LOI is to verify that the forecast schedule is reflective of the baseline. The forecast schedule is as-built and reflects work-arounds. However, with a few rare exceptions documented in QE LOI 6.D.8, status of the forecast schedule activities

should also be reflected in the baseline. If the percentage of activities and milestones missing from the baseline is large, a real danger exists that performance for the work expended is not counted towards performance measurement. For example, greater than 5% of difference between the activities in the forecast as compared with the baseline schedule indicates that the IMS does not provide accurate performance measurement information.

Impact of Noncompliance

A forecast schedule that is inconsistent with the baseline schedule will not provide an accurate representation of the project schedule performance.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Fuse: Determine the number of activities and milestones in the baseline schedule that are not found in the forecast schedule.
 - a. $X = \#$ of activities from the baseline IMS not found in the forecast IMS
Pass: $X = 0$
Fail: $X > 0$

2. Fuse: Determine the number of activities and milestones in the forecast schedule that are not found in the baseline schedule.
 - a. $X = \#$ of activities from the forecast IMS not found in the baseline IMS
Pass: $X \leq 5\%$
Fail: $X > 5\%$

Interview Questions

None

6.D.3 Is the IMS status data date consistent with the EVM Cost Tool month-end date?

Discussion

The status date in the IMS must be consistent with the month-end date in the contractor's EVM Cost Tool. Typically, the contractor's accounting month-end establishes the timing for conducting project status to ensure the data being reported is for the same time period.

Impact of Noncompliance

If the IMS status date and the Cost Tool reports different time periods, artificial variances are created. This inaccurate information makes prioritization of work very difficult.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the IMS schedule data date is consistent with the EVM Cost Tool month-end date.
 - a. Conduct a manual check to confirm the IMS schedule data date is consistent with the EVM Cost Tool month-end date.
 - b. Repeat for last six periods
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

6.D.4 Has the prime contractor CAM reviewed and approved the subcontractor's schedule status and is it accurately reflected in the Prime's IMS?

Discussion

The prime contractor has responsibility for the entire project work scope, including subcontracted effort. Normally, the prime will assign a CAM to manage the subcontracted effort. Some subcontracted effort may be part of the work scope of a CA that also uses in-house resources. Depending on the contractual relationship between the prime and the subcontractor, status is conducted (by the prime or sub) and incorporated into the prime's monthly report to DOE. In either case, the CAM is responsible to ensure the status is accurate. If the CAM disagrees with a subcontractors' measurement of progress, it is incumbent on the CAM to document the discrepancy and report progress as accurately as possible based on their assessment. The approval or disapproval should be documented in accordance with company guidelines.

Impact of Noncompliance

If the prime has not reviewed and approved a subcontractor's schedule status, the management of the subcontractor is suspect. This lack of management oversight may have adverse impacts on the successful performance of the project.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify how the subcontract is stated in the baseline and forecast schedules
 - a. Examine the IMS Data Dictionary or contact project controls to find out how subcontracted activity is coded in the IMS.
 - b. Filter for the subcontracted work.
 - c. Verify the matching subcontractor schedule is stated to the same date as the prime schedule.
 - d. Do the data dates in the IMS and the subcontractor schedule align?
 1. If not, are there processes in place to reconcile the differences sufficient to maintain the integrity of the IMS forecast dates and critical and driving paths?
 - e. Verify the subcontractor schedule is represented and stated.
 1. Full integration of the subcontractor schedule into the IMS?
 - a. Do the dates (actual and forecast), durations and progress from the subcontractor schedule match the dates and progress represented in the IMS?
 2. Summarized subcontractor schedule represented in the IMS?
 - a. Are the summarized dates (actual and forecast), durations and progress in the subcontractor schedule with those activities in the IMS?
 3. Milestone Representation of key delivery points and other events from the subcontractor schedule in the IMS?
 - a. Are the milestone dates (actual and forecast) and status consistent with the subcontractor milestones in the IMS?
 - f. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: For subcontracted effort, how is the subcontractor's schedule status approved (both the baseline and forecast)?
2. CAM: If the subcontractor's schedule data date and the IMS data date are not equal, how are the differences in dates and status reconciled?
3. CAM: How is subcontractor status input into the prime IMS? Can you please show me?

6.D.5 Are significant changes in float values reviewed by management?

Discussion

Float values will change as the schedule is statused or approved changes (e.g., baseline change proposals (BCPs) are implemented and network relationships are modified. Large changes in float merit management attention to ensure the float is accurate and errors have not been made. For example, If an activity has float of 23 days in one month, which changes to 75 days in the following month, some change in the schedule construction has occurred. Possibilities range from a CAM reduction in forecast duration in downstream activities, deletion of downstream activities or changes or deletions in logic. The reasons for the change must be researched and understood to validate the ongoing integrity of the schedule dates, and the tools and reports that depend on those dates. Routine schedule metrics including float are recommended monthly for analysis.

Impact of Noncompliance

Significant changes in float values between periods may indicate issues with the integrity of the schedule network.

Verification Steps

Data Analysis (Automatable)

1. Fuse. Is high float routinely reviewed and corrected? This test looks at float greater than 60 days and uses a 10% threshold.
 - a. $X = \#$ of activities and milestones from forecast IMS with change of float greater than 60 days / $Y = \#$ of incomplete activities and milestones. Calculate for 4 months and compare between each month for three comparisons.
Pass: $X/Y \leq 10\%$
Fail: $X/Y > 10\%$

Artifact Traces between Documents

None

Interview Questions

1. Project Controls: How are significant changes in float values identified, tracked and what is the process used to review the changes and flow of work (logic ties).
2. Project Manager: If a change in Total Float values results in activities becoming more critical how is this reviewed in terms of current resource allocations?

6.D.6 Are the workaround plans reflected in the forecast schedule, planned in such a manner to support a realistic critical path?

Discussion

Problems will occur over the life of the project. Some of the problems will require workaround planning. This includes rework and alternative sequencing. Workaround plans must be incorporated into the project forecast IMS and support the applicable WP and CA schedules ((meaning associated with the effort causing the workaround)). The activities representing workaround plans must be integrated into the schedule network following with a logical process to ensure the possibly revised critical path, near-critical paths, and driving paths are properly established. In effect, the workaround, when complete, is the path forward to mitigate a current problem within the forecast schedule.

Impact of Noncompliance

If workaround planning is not in the forecast schedule, the critical path is not realistic.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

None

Interview Questions

1. Project Manager: When technical workaround plans are implemented, how are changes to the critical and near critical paths documented and evaluated?
2. CAM: How do you identify and plan workaround plans in the IMS?

6.D.7 Are forecast schedule workaround plans that changed relationships as compared to the baseline logically reviewed, with concurrence by CAMs, other affected organizations and PMs?

Discussion

Once the project enters the execution phase, it is important that the forecast schedule is updated to reflect status and the impacts of that status, as well as other changes in condition. Often the original forecast plan is modified to take advantage of opportunities or in response to unanticipated delays in the work progress. Workaround plans are developed, reviewed and implemented to address these conditions in the forecast schedule.

Before implementation, the potential workaround plans are examined for realism in terms of timing (what are the impacts downstream to work based on these changes), resources (are the needed resources available based on the new demands of the potential plan) and technical content (will these changes alter the technical goals or requirements). As such, the CAMs is a significant partner to input realism in any workaround planning. Part of these workaround plans involve changing the logical relationships between activities. A good check is to compare the new logic to the original baseline plan logic to verify the new changes are valid. While forecast logic changes are not normally subject to change control using baseline change documentation (e.g., BCP, BCR, etc.), the CAM is still responsible for verifying the realism of the changes.

Impact of Noncompliance

If changes to the relationships are not reviewed and approved, there is a possibility the new relationships are not aligned to project goals and objectives.

Verification Steps

Data Analysis (Automatable)

1. Fuse: Verify change in relationships from prior month forecast schedule to current month forecast schedule
 - a. $X = \# \text{ of relationship changes (relationship types, lags, additions, subtractions) from prior month to current month} / Y = \# \text{ of relationships in current month}$
 - Pass: $X/Y \leq 5\%$
 - Fail: $X/Y > 5\%$

The purpose of the checks above is to see the magnitude of the changes. Ask the CAM and PM how they approved any changes.

Artifact Traces between Documents

1. Review the schedule change logs. Taking the results from automatic check 1 are any of the noted differences because of authorized changes?

Interview Questions

1. CAM: What role do you play when significant logic changes are required to the IMS? Do you provide input or approve these changes?
2. Project Controls: What controls are in place to analyze and address significant changes in logic from month to month?
3. PM: How are you advised on significant logic changes in the IMS? Do you approve these changes?

6.D.8 For activities without a baseline, are they designated as ETC only in the title or a code field?

Discussion

Occasionally, it may be necessary to insert activities in the forecast schedule that are not reflected in the baseline. These activities contain all the attributes expected in the IMS; correct code field assignments, descriptions, durations, links to other activities and resources required to perform the work. Some examples may include:

- Work as part of a Request for Equitable Adjustment (REA).
- Emerging work
- Workarounds with new mitigation activities
- Directed changes from the customer without a corresponding NTE
- Emergency efforts
- Over target baseline request not approved

These efforts are required to be in the forecast IMS because they may have impacts on existing budgeted work. However, since they do not currently have budgets, they should be isolated to new WPs, have unique charge numbers assigned for the purposes of recovering costs (if applicable) and should be addressed in the monthly CPR or IPMR Format 5 report. They must be clearly identified as Estimate to Complete (ETC), or ETC activities in either the Activity Name or an activity code field so they can be separately identified and monitored.

ETC-only activities are rare exceptions to the rule of unbudgeted and non-baselined activities in the IMS and should not be a normal part of the IMS framework. Rules for the development, use and closure of ETC-only activities, if allowed by the contractor, should be documented in the EVM SD prior to implementation. ETC-only activities are not a substitute for high level baseline planning and lower level forecast schedules. The intent is that the baseline and forecast are at the same level and there may be the need for additional activities at the same level for emerging work. A related QE LOI 6.D.2 requires less than 5% of activities in the forecast IMS should be without a baseline. This QE LOI adds the element of identification when they occur.

Impact of Noncompliance

Activities in the IMS forecast schedule without budgets and baseline dates circumvent the EVM system's ability to measure performance and schedule changes against the baseline plan.

Verification Steps

Data Analysis (Automatable) (Fuse)

Artifact Traces between Documents

1. Review contractor EVM SD and IMS Supplemental Guidance on approved process for the use of ETC-only activities.
 - a. Does the EVM SD allow for ETC-only activities in the forecast IMS?
 - b. Does the contractor's IMS Supplemental Guidance address how ETC-only activities are uniquely identified in the schedule?
 - c. Are ETC-only activities correctly identified in the forecast IMS?
 - d. Filter for non-baselined activities in the forecast IMS. Are the resultant activities correctly coded according to the EVM SD and IMS Supplemental Guidance?
 - e. Document any errors
2. Are ETC-only activities resource loaded? Document any ETC-only activities without an ETC.
3. Verify that WPs containing ETC-only activities have unique charge numbers
 - a. Identify ETC-only WPs in the EVM Cost Tool
 - b. Verify the WPs with ETC-only activities have unique charge numbers
Yes = Pass
No = Fail

Interview Questions

1. CAM: What was the rationale for using ETC-only activities in your WPs?

Guideline 6 – Scheduling Typical Artifacts Common to the QE LOIs

- Baseline and forecast IMS
- Working, field, or lower level schedules (may also be called daily schedules, plans of the day, plans of the week, field execution schedules, etc.)
- Schedule baseline change approval documentation
- Subcontract schedules
- IMS baseline and forecast dates
- Schedule logs
- IMS procedures
- Schedule Risk Assessment (SRA)

Guideline 7 - Identify Products and Milestones for Progress Assessment

Identify physical products, milestones, technical performance goals, or other indicators that will be used to measure progress.

This guideline is further broken out into subsections for clarification.

- Schedule Technical Accomplishments
- Schedule Change Traceability

Schedule Technical Accomplishments: requirements for completion criteria, work scope and nomenclature

Schedule Change Traceability: how to track schedule changes

7.A Subsection - Schedule Technical Accomplishments

The IMS must contain objective completion criteria to ensure progress is measured and reported accurately. Completion criteria for activities and WPs must clearly indicate what constitutes completion. Naming conventions of activities play an important role in providing clarity to "what done looks like". The detailed activities in the IMS as well as interim milestones for longer duration WPs provide objective indicators of progress. The use of redundant names for activities in the schedule is highly discouraged as clarity is greatly reduced and it creates confusions during the status cycle.

The guideline is further defined by QE LOI shown below.

7.A.1	Do Work Package EVT's result in the ability to claim progress in all months in which resources are scheduled at the time the Work Package is baselined and based on objective indicators as appropriate?
7.A.2	Are the schedule activity names unique and do they describe the work being performed?
7.A.3	Are technical performance goals integrated as indicators of progress when planning and measuring performance?
7.A.4	Is discrete performance determined in the IMS identically represented in the EVM Cost Tool?

QE LOIs Repeated With Discussions

7.A.1 Do Work Package EVT's result in the ability to claim progress in all months in which resources are scheduled at the time the Work Package is baselined and based on objective indicators as appropriate?

The intent of earned value as it relates to objective criteria and EVT's is that the work is statused consistent with the technical progress. Said a different way, if the work is on schedule it should not have a schedule variance, and if behind or ahead of schedule it

should have a negative or positive schedule variance. This is accomplished with objective indicators that reflect technical accomplishment in the BCWP value for all discrete work and for each of the project's key events, decision points, and milestones. This is essential for ensuring accurate schedule status and providing project management visibility into project progress and credible early indications of project problems and the need to take corrective action.

The objective indicators required at the WP level depends on the EVT. For example:

- 0/100 is limited to activities that will be complete within the same accounting month as the start. They should not exceed 21 work days in duration. The objective indicator is the WP exit criteria.
- 50/50 is limited to activities with durations of two accounting periods (i.e. 42 work days or less). The objective indicator is the WP exit criteria.
- Milestones or Milestone weights with percent complete. The objective indicators are the milestone definitions/definitions of completion. Note, to meet the intent of the QE LOI, milestone weights with percent complete require at least one technically-based milestone every other month to prevent artificial schedule and cost variances.
- Percent Complete requires objective indicators. If the duration of the activity is within a single accounting month, the objective indicator is the activity exit criteria, just like a 0/100 technique. Above this duration should be supported by quantifiable backup data (QBDs) or rules of performance or schedule of values that restrict the percentage completion to predetermined measures of technical progress. These QBDs are subject to change control once the WP has started and should also have enough technically-based QBDs so at least one can be completed every month, preventing artificial schedule and cost variances.
- LOE is not an objective EVT and therefore has no objective indicators. LOE performance is claimed solely by the passage of time and will be claimed regardless whether any actual work was performed. For this reason the use of LOE as and EVT should be limited solely to work that is not measurable.
- Apportioned effort is work associated with other discrete work and therefore has no specific unique objective indicators; however, the methods of the apportionment must be documented, logical and demonstrable. Apportioned effort must have a direct relationship to discrete work whereby the percent complete reported by the discrete effort is appropriate for the percent complete to be reported by the apportioned effort.

WP EVTs may be assigned at the WP level or to the activities within the WP supported by EVTs at the schedule activity level. The official EVT WP percent complete is determined by the sum of activity percent complete BCWP of WP activities reported to the EVM Cost Tool. When supported by activity level EVTs the following aspects are required

- Discrete WPs should not comingle discrete and LOE activities. If LOE activities are contained within a predominantly discrete WP, the LOE work should not exceed 10 percent and the performance of the discrete work must be clearly discernable.
- LOE comingling with discrete work at the activity level follows the comingling restrictions in QE LOI 12.A.5
- Discrete activities must be associated with EVT's follow the EVT duration guidelines in this QE LOI.
- BCWP is calculated by activity and summarized to the WP level in the EVM Cost Tool to calculate the percent complete.
- The percent complete in the IMS is transferred to the percent complete in the EVM Cost Tool.

Impact of Noncompliance

Inability to accurately convert technical progress into a measure of performance (i.e., BCWP) invalidates the EVM reporting of the project.

Verification Steps

Data Analysis (Automatable)

1. $X = \#$ of incomplete discrete activities without EVT's in the baseline IMS, excluding PP and SLPP
 Pass: $X = 0$
 Fail: $X > 0$
2. Fuse: $X = \#$ of in-progress and future activities without resource assignments in the EVM Cost Tool and the IMS, if the schedule is resource loaded, for each period in the PoP (exclude SVT's and Schedule Margin activities).
 Pass: $X = 0$
 Fail: $X > 0$
3. Verify that activities assigned a 0/100 EVT are limited to one accounting period.
 $X = \#$ of 0/100 EVT activities having a baseline duration that exceeds one accounting period (i.e. 21 days duration).
 Pass: $X = 0$
 Fail: $X > 0$
4. Verify that activities assigned a 50/50 EVT are limited to two accounting months.
 $X = \#$ of 50/50 EVT activities having a baseline duration that exceeds two accounting periods (i.e. 42 days).
 Pass: $X = 0$

Fail: $X > 0$
Change tests for new narrative

Artifact Traces between Documents

1. Verify that WPs using milestone, milestone weights with % complete, and % complete are supported by objective technical measures and have enough measures to take performance at least once a month. There should not be planned periods of time where budgets are planned and actual costs can be accrued without the possibility to earn performance against the budget.
2. Determine the number of in-progress and future activities without resource assignments. $X = \#$ of in-progress and future activities without resource assignments in the EVM Cost Tool and the IMS, if the schedule is resource loaded, for each period in the PoP (exclude SVTs and Schedule Margin activities).

Pass: $X = 0$

Fail: $X > 0$

Interview Questions

None

7.A.2 Are the schedule activity names unique and do they describe the work being performed?

Discussion

Activity names that describe the effort and completion criteria help the CAM easily identify the work scope, identify the scope to be performed and provide an accurate status. An example would be; “complete drawing package for East wall of Building 7” or “Complete soil testing for Annex Road A”. This requirement can also be satisfied with a coding field associated with the activity and/or clarified in the data Dictionary.

Impact of Noncompliance

Lack of identification of unique and meaningful names for activities in the IMS may cause inaccurate BCWP status.

Verification Steps

Data Analysis (Automatable)

Artifact Traces between Documents

1. Verify the IMS has unique activity names.
 - a. Sort the schedule by the titles.
 - b. Scroll down and verify there are not duplicative titles on all incomplete work.
 - c. Threshold is 0.

2. Verify IMS activity names are action driven and descriptive of the scope.
 - a. Conduct a manual check of incomplete activities that do not contain a verb and are not action driven
 - b. $X = \#$ of incomplete activities that are not action driven
Pass: $X = 0$
Fail: $X > 0$
 - c. $X = \#$ of incomplete milestones that do not describe the start or completion of effort in the IMS
Pass: $X = 0$
Fail: $X > 0$

Interview Questions

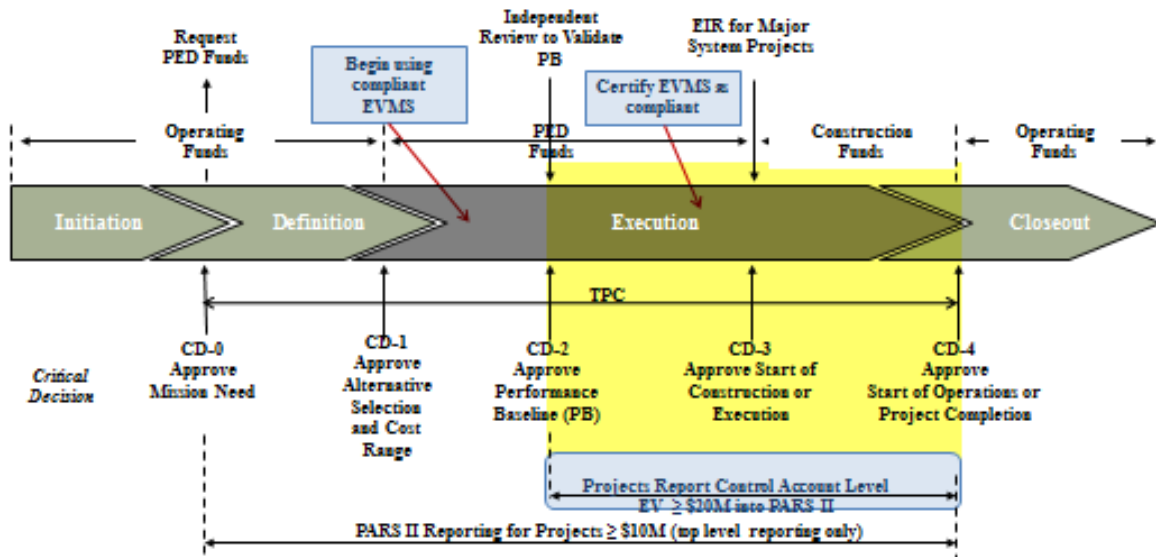
None

7.A.3 Are technical performance goals integrated as indicators of progress when planning and measuring performance?

Discussion

As part of the contract between supplier and the DOE, key events, delivery dates and other milestones are negotiated and bound by the agreement between the two parties. The most visible of these goals are the Critical Decision milestones 1 – 4 on the project. As indicated in the following graphic, the CD milestones help define the boundary points between project initiation, definition, execution and operations.

EVMS Requirements Tied to DOE's Acquisition Lifecycle



Typical DOE Acquisition Management System for Line Item Capital Asset Projects

Figure 6 - EVMS Requirements – Source PMOA EVM Training Snippet 1.1

This basic framework provides an execution plan structure to the IMS to supplement the WBS (product) and OBS (responsibility) coding structures. However the contract, PEP, SOW, Work Statement and other documents also identify other milestones that require effort to perform and therefore impact the IMS. These items may include document deliveries, reports, and other closure items signaling the completion of work. Milestones that could influence the IMS calculations have the appropriate predecessors and successor links established in the baseline and in the forecast schedule to provide management with the correct dates and paths.

At a lower level, CAMs may find portions of their schedule effort require interim performance measures to assess the technical progress of their CAs or activities every month. These measures, also known as Quantifiable Backup Data (QBDs), are represented as steps in completing the activity. These QBDs define the technical effort to be completed and weighted as a percent of the budget earned when completed. When used to assess progress against longer duration work (e.g. > 2 months), the CAM develops sufficient QBDs so some progress may be earned monthly, if they are on schedule.

Impact of Noncompliance

Missing technical performance goals in the IMS leaves management without visibility into the progress towards achieving project goals and completing on time.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Identify all major events and milestones and verify they exist in both the baseline and forecast IMS.
 - a. Are they appropriately labeled in the activity name?
 - b. Do they have both predecessors and successors?
 - c. Are they correctly coded?
 - d. Document all discrepancies as compliance concerns
2. Verify appropriate usage of QBDs in the IMS
 - a. Review the IMS supplemental guidance on the use of QBDs
 - b. Filter for incomplete discrete activities that span more than 2 accounting periods in the baseline schedule
 - c. Evaluate the methods for measurement of progress in these activities
 1. If the CAM is using the Steps capability of P6, are the steps sufficiently documented to describe the technical completion of each step?
 2. Do the weightings reasonably represent the accomplishment of the technical effort associated with the step?
 3. Are the steps defined in both the baseline and forecast schedule? Are the number and scope of the steps consistent in the baseline and forecast schedule? (Steps should be under change control to avoid changing the rules of performance while in execution.)
 4. If the CAM is documenting QBDs in another document, such as an Excel file, are the QBDs sufficiently documented to describe the technical completion of each step?
 5. Do the weightings reasonably represent the accomplishment of the technical effort associated with the QBD?
 6. If the CAM is using the output from another system to measure accomplishment, does the measurement meet the requirements of technical accomplishment at a detailed enough level to provide progress every month if the work is on schedule?
 - d. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: Please explain the process for establishing and providing status for your measurement QBDs.
2. Project Controls: Please explain any interfaces with other systems that provide technical performance measurement through the IMS to the EVM Cost Tool.

7.A.4 Is discrete performance determined in the IMS identically represented in the EVM Cost Tool?

Discussion

In a fully integrated EVM System, the IMS is the source for dates and progress of discrete effort to the EVM Cost Tool. The technical basis of progress is reported to the EVM Cost Tool, summarized if necessary and produces BCWP for analytical use to support managerial decisions. The pathway from schedule baseline to schedule forecast, to status, to BCWP must be documented, consistent and accurate.

When the CAM provides status to the schedule, at least on a monthly basis, the same information must be accurately reflected in the products from the EVM Cost Tool without adjustments from outside departments or individuals. The progress status reported by the CAM is based on technical achievement, not on elapsed activity duration. Therefore, progress is reported and transmitted to the EVM Cost Tool based on physical % complete or other fields, and not on a percent complete based elapsed planned duration. With these processes in place, many issues that are identified in the EVM data can easily be traced back to the IMS for cause, impact and corrective action.

Impact of Noncompliance

If the IMS and the EVM Cost Tool are out of alignment with reporting progress, management and customer are deprived of sufficient reliable information to make competent management decisions.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor EVM SD and IMS Supplemental Guidance.
 - a. Verify how progress is transferred from the IMS to the EVM Cost Tool. It must not be based on any activity duration percent complete (including activity % complete, duration % complete, schedule % complete, or any other % completes that are not based on CAM input assessment of technical accomplishment).
2. Compare the technical accomplishment in the schedule to the percent complete in the Cost Tool for percent complete EVT's. All numbers should match.
3. Document all discrepancies as compliance concerns

Interview Questions

None

7.B Subsection - Schedule Change Traceability

Changes to the start and completion dates of activities must support the next higher level schedule and be within the PoP found in the work authorization documentation for the applicable CA. Changes to the baseline schedule must follow the contractor's change control process. This process ensures traceability from the original to the revised schedule.

The guideline is further defined by QE LOI shown below.

7.B.1	Are project changes tracked in the schedule so that baseline traceability from the prior month is demonstrable?
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QE LOIs Repeated With Discussions

7.B.1 Are project changes tracked in the schedule so that baseline traceability from the prior month is demonstrable?

Discussion

Schedule changes follow a baseline change process which requires transparency regarding exactly what is changing. Documentation is required to reflect the schedule condition before the requested change and after the change and rationale providing management sufficient visibility when reviewing and approving the change.

Impact of Noncompliance

A schedule without traceability to the original may no longer be consistent with the approved scope of the project

Verification Steps

Data Analysis (Automatable)

1. Compare prior period baseline IMS start and finish to current period IMS start and finish and note any baseline changes.

Artifact Traces between Documents

1. Taking the results of data analysis 1 above with the baseline changes for the current month, verify all changes were approved via change control.
 - a. Document all discrepancies as compliance concerns
2. Compare the baseline changes in the IMS to the approved budget/baseline change documentation (BCPs, BCRs, etc.) and to the baseline changes reported in the IPMR/CPR Format 3 (as applicable). Verify they are consistent.

- a. Document all discrepancies as compliance concerns

Interview Questions

None

Guideline 7 – Objective Indicators Typical Artifacts Common to the QE LOIs

- Baseline and Forecast Integrated Master Schedule (current and prior)
- Budget Change Documentation (Budget Change Proposals (BCPs), Budget Change Requests (BCRs), etc.)
- EVM Cost Tool
- Quantifiable Backup Data (QBD)
- IPMR/CPR Format 3

Guideline 8 - Establish the Performance Measurement Baseline (PMB)

Establish and maintain a time-phased budget baseline, at the control account level, against which program performance can be measured. Initial budgets established for performance measurement will be based on either internal management goals or the external customer negotiated target cost including estimates for authorized but undefinitized work. Budget for far-term efforts may be held in higher level accounts until an appropriate time for allocation at the control account level. If an over-target baseline is used for performance measurement reporting purposes, prior notification must be provided to the customer.

This guideline is further broken out into subsections for clarification.

- PMB Development
- SLPPs
- Authorized Unpriced Work (AUW)
- OTB/OTS

PMB Development: how the PMB is developed, reconciliations and approvals.

SLPPs: address content and control of SLPPs.

AUW: how to handle and manage AUW, if any.

8.A Subsection - PMB Development

The Performance Measurement Baseline (PMB) is a direct reflection of the IMS and is a time phased budget plan of the IMS activities. The definition of PMB also includes Undistributed Budget (UB), which is not yet time phased (see Guideline 14). The IMS is a network of activities sequenced in the same manner in which the project is to be executed with resources applied to the activities. The PMB time phasing must directly reconcile with the resource loaded IMS. It is the numeric representation of exactly the same plan as the IMS. The PMB's time phased budget is more commonly referred to as the Budgeted Cost for Work Scheduled (BCWS).

The guideline is further defined by QE LOI shown below.

8.A.1	Is the time-phased PMB in alignment with the IMS (i.e. is the distributed budget in the EVM Cost Tool consistent with timing of the work scope in the IMS, including all Control Accounts and Summary Level Planning Packages)?
8.A.2	Is all PMB budget allocated at or below the reporting level?
8.A.3	Do the Control Account budgets plus Summary Level Planning Packages, plus UB sum to the PMB?
8.A.4	Does the PMB plus MR equal the Contract Budget Base? (If an Over Target Baseline is in place does the new PMB plus MR equal the Total Allocated Budget)?

8.A.5	Does the CBB reconcile with the Total Project Cost as applicable?
8.A.6	Does the time-phased PMB and ETC reflect the resources planned to perform the authorized work scope?
8.A.7	Do CAMS approve the Control Account planning?
8.A.8	Has the prime contractor CAM reviewed and approved the integrity of the subcontractor's PMB?
8.A.9	Are Control Accounts and WPs opened and closed consistent with the actual start and completion as stated in the IMS?
8.A.10	If an OTB/OTS has been approved and implemented, has the work authorization been changed to reflect the OTB/OTS values?
8.A.11	Has OTB/OTS had prior customer approval?

QE LOIs Repeated With Discussions

8.A.1 Is the time-phased PMB in alignment with the IMS (i.e. is the distributed budget in the EVM Cost Tool consistent with timing of the work scope in the IMS, including all Control Accounts and Summary Level Planning Packages)?

Discussion

The PMB is the time-phased budget plan against which actual performance is assessed. The Contract Budget Base (CBB) value used to establish the PMB is tied to the current value of the contract, including any Authorized, Unpriced Work (AUW). The contractor ensures that the resource plan is executable within budget and schedule constraints and is realistic to achieve the contract scope.

The PMB, exempting UB, is the time phased budget plan that is comprised of SLPPs and CAs. SLPPs are for future effort that cannot be realistically identified to a CA. They are higher level planning accounts above the CA level that identify scope, schedule and associated budget, but have not been assigned to CAs. CAs are detail planned in WPs for the near term effort and planned in PPs for the far term effort (see guideline 10). The PMB must be planned consistent with the baseline schedule dates and durations in the IMS for authorized work.

Impact of Noncompliance

An inaccurate PMB invalidates cost and schedule analysis.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm the baseline start/finish dates of the CAs in the EVM Cost Tool are consistent with the authorized and scheduled baseline start/finish dates of the IMS and WADs. This check is related to Guideline 3 and focused on the PMB consistency.
 - a. Use the CAPs or the equivalent that shows baseline start and finish by WP from the EVM Cost Tool and compare the baseline start and finish dates of the CA to the baseline start and finish dates within the IMS. All comparisons of the IMS to the EVM Cost Tool should consider the difference in measurement between the IMS and EVM Cost Tool. The IMS plans in days and the EVM Cost Tool typically in accounting months or periods. This check and all other comparisons verify that the dates of the schedule start in the IMS and EVM Cost Tool are within the same accounting month if the EVM Cost Tool does not track exact dates for spreading.
 1. Example: The contractor's accounting calendar for July ends on July 25. The baseline IMS date for an activity starts on July 26; therefore, this would be reflected in the EVM Cost Tool in the accounting month for August.
 - b. Repeat the same comparisons of baseline start and baseline finish fields in the CAP or equivalent to confirm that these dates fall within the WP earliest start date and the latest finish date for the baseline IMS.
 - c. Compare the CAP to the CA WAD to ensure that the baseline dates fall within the start and finish dates on the WAD.
 - d. This trace is to be performed for 3 consecutive periods, with the last being the most current period in the data call.
 - e. Document all discrepancies as compliance concerns. The baseline start and baseline finish dates in the IMS should be in the same accounting month as the budget.

Example for clarification

Acct Calendar Start	Acct Calendar Finish	IMS Start	IMS Finish	EVM Cost Tool CA Start	EVM Cost Tool CA Finish	Concern
5/1/15	5/31/15	5/15/15	6/15/15	May 15	Jun 15	No
6/1/15	6/31/15	5/15/15	6/15/15	May 15	May 15	Yes

7/1/15	7/31/15	5/29/15	8/2/15	June 15	Jul 15	Yes
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Figure 7 - Example IMS to Accounting Calendar Days

2. Confirm the baseline start/finish dates of the WPs/PPs in the EVM Cost Tool are contained within the authorized and scheduled baseline start/finish dates of the CAs.
 - a. X = # of WPs/PPs that begin or finish after the baselined start/finish dates of the CAs
 - b. Tolerance = 0

3. Verify the accounting calendar is reflected in the EVM Cost Tool and both discrete and LOE effort is time phased within the fiscal periods corresponding to the project PoP.
 - a. Request the accounting calendar and any related procedural documentation.
 - b. Confirm the accounting calendar dates are consistent with those in the EVM Cost Tool.
 - c. Using the EVM Cost Tool data, confirm the budget spreads for discrete and LOE efforts are designated by fiscal periods. While the budget should be spread based on timing of the work effort, there should be continuous budget based on the underlying work scope unless justification exists for any gap.
 - d. In correlation with guideline 12, if the time phased budgets for LOE are level loaded for the PoP, follow up with an interview question on how this work is planned and budget spreads are justified.
 - e. Confirm the first and last fiscal period corresponds to the start and end date of the PoP for the project.
 - f. This trace is to be performed for 3 consecutive periods, with the last being the most current period in the data call.
 - g. Document all discrepancies as compliance concerns

Interview Questions

None

8.A.2 Is all PMB budget allocated at or below the reporting level?

Discussion

The PMB must be allocated to CA budgets, SLPPs or UB, all of which are required to be reported on a monthly basis, generally via Format 1 of the IPMR/CPR. In other words the full PMB is accounted for at all times and the sum of CA budgets, SLPP budgets, and UB is always equal to the documented budget of the PMB. This requirement ensures that all work scope has been properly budgeted at the correct level.

The reporting level is the agreement with DOE for reporting in PARSIIIE.

Impact of Noncompliance

An inaccurate PMB results in inaccurate performance reporting for the project and leads to poor project decision making.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the PMB is fully allocated to CA budgets, UB and SLPPs.
 - a. Use the CBB Log and locate the current BAC for the PMB.
 - b. Utilizing the IPMR/CPR Format 1, confirm that the PMB total listed in column 8.a.14 (BAC) equals the total PMB in the CBB log.
 - c. Continuing up column 8.a.14 of the IPMR/CPR report, verify the PMB is allocated appropriately by verifying that all reporting elements, including UB (as appropriate), have an amount greater than 0.
 - d. This trace is to be performed for 3 consecutive periods, with the last being the most current period in the data call.
 - e. Document all discrepancies as compliance concerns

Interview Questions

None

8.A.3 Do the Control Account budgets plus Summary Level Planning Packages, plus UB sum to the PMB?

Discussion

The CA budgets, SLPPs and UB are the only three elements that compose the PMB therefore; the sum of these must equal the PMB. Refer to an excerpt from the DOE Gold card below:

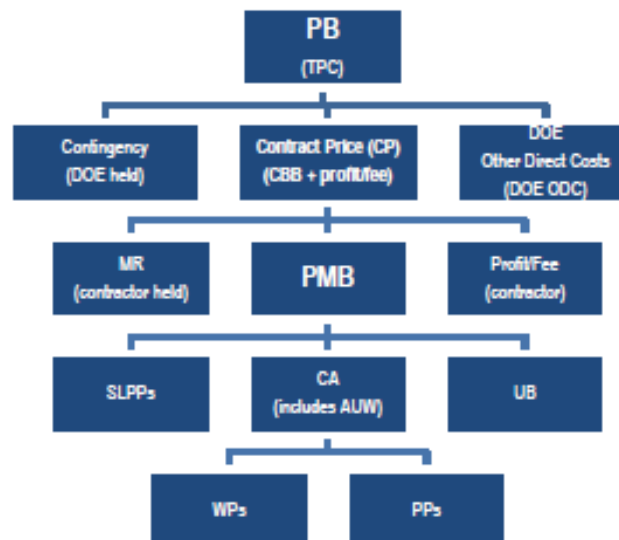


Figure 8 - Cost Hierarchy

Impact of Noncompliance

An inaccurate PMB means earned value is not reported accurately for the total project.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the sum of the three components of the PMB (CAs, SLPPs, and UB) equals the PMB (or $\Sigma(\text{CA} + \text{SLPP}) + \text{UB} = \text{PMB}$).
 - a. Using the output from the EVM Cost Tool for all CAs/SLPPs, verify that the sum of the total budgets plus UB matches the budget shown on the IPMR/CPR, block 8.e.14.
 - b. Select one reporting level element on the IPMR/CPR, and verify that the BAC shown in block 8.a.14 directly reconciles with the sum of the budgets for the relevant CAPs in the EVM Cost Tool output.
 - c. This trace is to be performed for 3 consecutive periods, with the last being the most current period in the data call.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

8.A.4 Does the PMB plus MR equal the Contract Budget Base? (If an Over Target Baseline is in place does the new PMB plus MR equal the Total Allocated Budget)?

Discussion

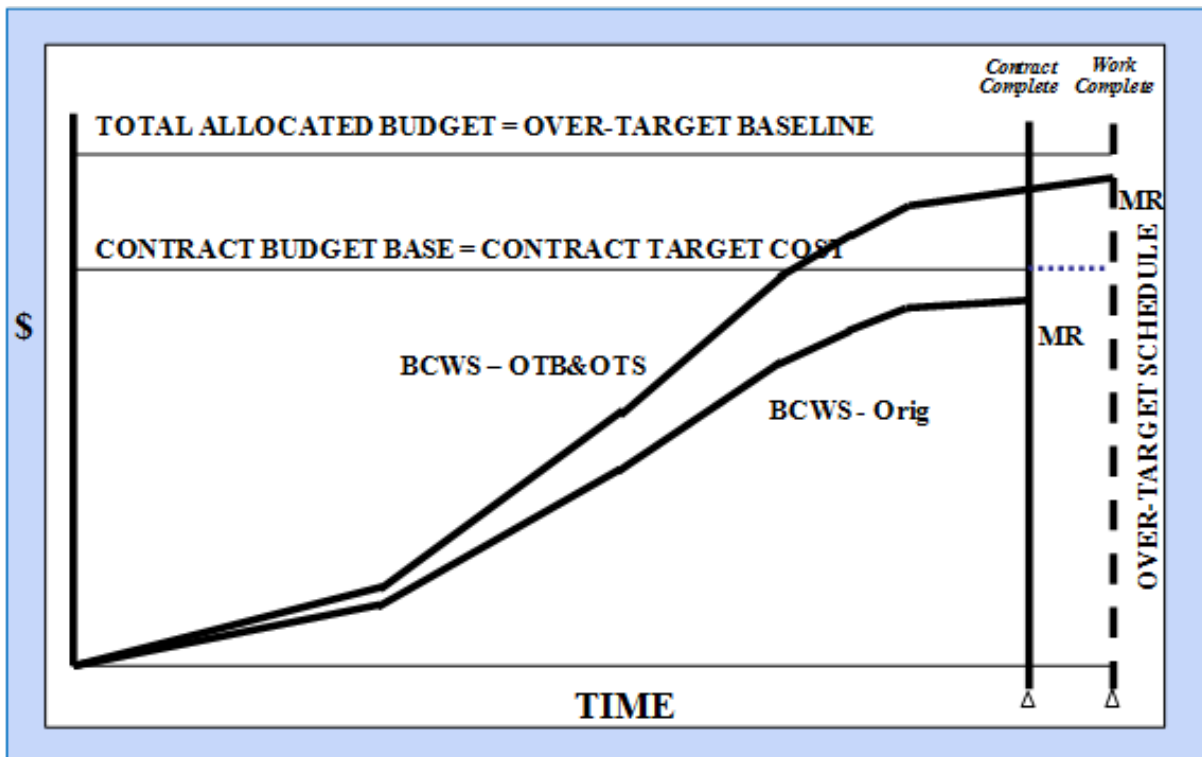
One of the basic EVMS formulas is the requirement that $\text{PMB} + \text{MR}$ equal the Contract Budget Base (CBB) – the project/contract value at cost.

During the life of a project, situations may arise whereby budgets for the remaining work are insufficient to complete the budget and to accurately measure performance.. Under these circumstances, a requirement may exist for the total budget allocated for work to exceed the CBB. When the costs to complete the project exceed the CBB, the resulting value is called an OTB (i.e. $\text{CBB} + \text{overrun} = \text{OTB}$). If the contractor recognizes that additional budget is necessary to accomplish the project goals and DOE approves, this budget may be added to the baseline to create an OTB. Note that it is the responsibility of the contractor to initiate a request for an OTB and DOE must approve it before an OTB can be implemented. If DOE does not approve the OTB the contractor must reflect the additional costs as overruns without adjusting the CA budgets within the PMB. It should also be noted that an OTB is not a contractual action and the CBB value is not changed.

Subcontractor flow down, where it relates to formal reprogramming, is the prime contractor's responsibility to approve and manage.

When the contractor and DOE project managers are satisfied that the new baseline represents a reasonable plan for completing the work, the new baseline becomes the basis for future performance measurement. With an approved OTB the formula for the Total Allocated Budget (TAB) is $TAB = CBB + OTB$ where OTB represents the value of the forecast overrun. The revised PMB would consist of the value of the original PMB plus the over target budget allocated to each CA. That value plus the MR should equal the new TAB. Prior to approving the revised PMB, it should be jointly reviewed by the contractor and the government to verify that it represents an achievable budget and schedule can be successfully executed.

OTB Implementation



Projects with a CPR/IPMR requirement report the OTB in format 1. It is also reported in

Figure 9 - OTB Implementation

Formats 3 and 5. As seen below the format 1 is modified with an OTB implementation:

The prime reporting format for size correction or estimation is estimated to average 3.0 hours per response, including one hour for reviewing information, reviewing existing data sources, generating and reviewing the correction or estimation. Items concerning reporting this format estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (304-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other notice that a collection of information may be subject to the requirements of Title 5 (28 CFR 1700135), it will not display a currently valid OMB control number. PLEASE DO NOT RETURN FORM TO THIS ADDRESS. BUDGET COMPLETED FORMS IN ACCORDANCE WITH CONTRACTUAL REQUIREMENTS.

1. CONTRACTOR		2. CONTRACT		3. PROGRAM		4. REPORT PERIOD	
a. NAME	a. NAME	a. NAME	a. NAME	a. FROM (YYYYMMDD)	b. TO (YYYYMMDD)	b. FROM (YYYYMMDD)	b. TO (YYYYMMDD)
b. LOCATION (Address and ZIP Code)	b. NUMBER	b. PHASE	c. EVMS ACCEPTANCE NO				
c. TYPE	d. SHARE RATIO	e. ESTIMATED PRICE	f. ESTIMATED PRICE				
5. CONTRACT DATA		6. ESTIMATED COST AT COMPLETION		7. AUTHORIZED CONTRACTOR REPRESENTATIVE		8. DATE SIGNED	
a. QUANTITY	b. NEGOTIATED COST	c. ESTIMATED COST OF AUTHORIZED UNPRICED WORK	d. TARGET PROFIT/ FEE	e. TARGET PRICE	f. ESTIMATED CEILING	g. CONTRACT CEILING	h. ESTIMATED CONTRACT CEILING
MANAGEMENT ESTIMATE AT COMPLETION		CONTRACT BUDGET BASE		a. NAME (Last, First, Middle Initial)		b. TITLE	
a. BEST CASE	(1)	(2)	(3)				
b. WORST CASE							
c. MOST LIKELY							
9. PERFORMANCE DATA		CURRENT PERIOD		CUMULATIVE TO DATE		AT COMPLETION	
ITEM	BUDGETED COST	ACTUAL COST	BUDGETED COST	ACTUAL COST	COST VARIANCE	BUDGETED	ESTIMATED VARIANCE
	WORK SCHEDULED	WORK PERFORMED	WORK SCHEDULED	WORK PERFORMED	SCHEDULE VARIANCE	(14)	(15)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
a. WORK BREAKDOWN STRUCTURE ELEMENT	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	(16)	(17)	(18)	(19)	(20)	(21)	(22)
b. COST OF MONEY		c. GENERAL AND ADMINISTRATIVE		d. UNDISTRIBUTED BUDGET		e. SUB TOTAL PERFORMANCE MEASUREMENT BASELINE	
f. MANAGEMENT RESERVE		g. TOTAL		h. TOTAL		i. TOTAL	

Reprogramming adjustments Budget Column 13 is the difference between the OTB and CBB overall and by WBS element. Please see the IPMR or CPR DID for more explanation

Figure 10 - Format 1 of the CPR

Impact of Noncompliance

Failure to properly implement an approved OTB will result in a poorly integrated plan and increased risk of failure in project execution.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Per IPMR/CPR Format 1, confirm the sum of PMB (including over target budget) + MR equals the TAB.
 - a. Examine the CBB log. Confirm the PMB value plus MR equals CBB or TAB if an OTB has been approved. If an OTB has been approved and implemented, the amount of the over target budget should be clearly identified and tracked.
 - b. In the Format 1 of the IPMR/CPR if an OTB has been implemented, the amount of the over target budget will be reflected by reporting level element in Block 8.a.13.
 - c. Compare the total for the over target budget in Block 8.g.13 to the amount entered for the over target budget in the CBB log.
 - d. If there is an approved OTB, cost and schedule variances may have been adjusted. These will be reflected by reporting element in Blocks 8.a.12a and 8.a.12b, and summed in Blocks 9.a. and 9.b. (reprogramming adjustments entered in Blocks 9.a and 9.b will reconcile to the increase in budget in the CBB). Compare the CBB in Block 6.c (2) to the TAB in Block 8.g.14. The difference in these numbers should be equal to the amount of the over target budget in Block 8.g.13.
 - e. Document all discrepancies as compliance concerns
 - f. The following graphic shows the impact of the changes of an OTB to the IPMR/CPR.

CLASSIFICATION (When Filled In)

CONTRACT PERFORMANCE REPORT FORMAT 1 - WORK BREAKDOWN STRUCTURE												DOLLARS IN		FORM APPROVED OMB No. 0704-0188		
The public reporting burden for this collection of information is estimated to average 3.1 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THIS ADDRESS. SUBMIT COMPLETED FORMS IN ACCORDANCE WITH CONTRACTUAL REQUIREMENTS.																
1. CONTRACTOR			2. CONTRACT			3. PROGRAM			4. REPORT PERIOD							
a. NAME			a. NAME			a. NAME			a. FROM (YYYYMMDD)							
b. LOCATION (Address and ZIP Code)			b. NUMBER			b. PHASE			b. TO (YYYYMMDD)							
c. TYPE			a. SHARE RATIO			c. EVMS ACCEPTANCE NO YES (YYYYMMDD)										
5. CONTRACT DATA																
a. QUANTITY	b. NEGOTIATED COST	c. ESTIMATED COST OF AUTHORIZED UNPRICED WORK	d. TARGET PROFIT/ FEE	e. TARGET PRICE	f. ESTIMATED PRICE	g. CONTRACT CEILING	h. ESTIMATED CONTRACT CEILING	i. DATE OF OT/OTS								
	N/C	N/C	N/C	N/C	CHANGE	N/C	N/C	CHANGE								
6. ESTIMATED COST AT COMPLETION																
MANAGEMENT ESTIMATE AT COMPLETION (1)				CONTRACT BUDGET BASE (2)				VARIANCE (3)								
a. BEST CASE																
b. WORST CASE																
c. MOST LIKELY	CHANGE			N/C												
7. AUTHORIZED CONTRACTOR REPRESENTATIVE																
a. NAME (Last, First, Middle Initial)								b. TITLE								
c. SIGNATURE								d. DATE SIGNED (YYYYMMDD)								
8. PERFORMANCE DATA																
ITEM (1)	CURRENT PERIOD						CUMULATIVE TO DATE						REPROGRAMMING ADJUSTMENTS		AT COMPLETION	
	BUDGETED COST WORK SCHEDULED (2)	WORK PERFORMED (3)	ACTUAL COST WORK PERFORMED (4)	VARIANCE (5) SCHEDULE (6) COST (6)		BUDGETED COST WORK SCHEDULED (7)	WORK PERFORMED (8)	ACTUAL COST WORK PERFORMED (9)	VARIANCE (10) SCHEDULE (11) COST (11)		COST VARIANCE (12a)	SCHEDULE VARIANCE (12b)	BUDGET (13)	BUDGETED (14)	ESTIMATED (15)	VARIANCE (16)
a. WORK BREAKDOWN STRUCTURE ELEMENT																
CURRENT AND CUM BCWS AND/OR BCWP WILL INCLUDE ADJUSTMENTS IF SCHEDULE OR COST VARIANCES ARE ZEROED OUT																
SHOW CV CHANGES IF ADJUSTED																
SHOW SV CHANGES IF ADJUSTED																
SHOW ADDITIONS TO BAC																
NEW BAC (EXCEEDS CBB)																
NEW EAC																
SHOULD BE ZERO																
b. COST OF MONEY																
c. GENERAL AND ADMINISTRATIVE																
d. UNDISTRIBUTED BUDGET																
e. SUB TOTAL (PERFORMANCE MEASURE BENT BASELINE)																
f. MANAGEMENT RESERVE																
g. TOTAL																
h. RECONCILIATION TO CONTRACT BUDGET BASE																
TOTAL OF 8.g + 9.a																
i. VARIANCE ADJUSTMENT																
j. TOTAL CONTRACT VARIANCE																
DD FORM 2734/1, MAR 05																

LOCAL REPRODUCTION AUTHORIZED.

CLASSIFICATION (When Filled In)

Figure 11 - Format 1 of the CPR

8.A.5 Does the CBB reconcile with the Total Project Cost (TPC) as applicable?

Discussion

The CBB + Fee or Profit + DOE held Contingency + any other ODC = the Total Project Cost (TPC). The summary of these elements should be in balance at all times. Note – FAR Part 15 contracts may not track DOE contingency. EVM compliance does not require tracking DOE contingency. However, if DOE Contingency is tracked, this QE LOI is applicable.

Impact of Noncompliance

Project would not be aligned with the authorized total project cost.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify all budgets (CA, SLPP, MR, UB, and Fee) + DOE held Contingency + any other DOE ODC sum to Target Project Cost (TPC) as applicable.
 - a. Review the CBB log and values for PMB, Fee, MR/UB, DOE Contingency (if any), and DOE ODC (if any), sum to Target Project Cost.
 - b. Refer to the DOE Gold Card for guidance on the Total Project Cost components.
 - c. Compare the CBB log with PARSIIIE Project Summary Report. The values should reconcile for the latest baseline change documentation (BCP, BCR, etc.).
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

8.A.6 Does the time-phased PMB and ETC reflect the resources planned to perform the authorized work scope?

Discussion

One of the foundational principles of earned value is that of a realistic and achievable baseline and forecast plan. People perform the work. The baseline and forecast should contain a time phased resource plan by element of cost (EOC) that will accomplish the work scope on schedule and within budget. Material and subcontract budgets are time-phased to support project schedule requirements. (Refer to Guideline 27 for more detailed information about the ETC.)

Impact of Noncompliance

An unrealistic baseline or forecast renders EVM data useless.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Evaluate the overall manpower profile, material cost projections, and other profiles by EOC to determine if unrealistic or unachievable spikes/dips in resources exist.
 - a. Using the electronic CAPs by EOC and the forecast IMS, compare the spikes/dips in resource allocation by EOC in the CA. This check is performed using monthly values and not cumulative amounts.
 - b. Using the forecast IMS look at a resource profile. This check may alternately use an ETC amount in the electronic CAP, if available. Look at the ETC by EOC by CA and verify no unrealistic significant spikes or dips

- exist. Note significant is subjective but generally a 10% swing not accounted for by a long accounting month would be considered significant without justification.
- c. Repeat the above checks at the summary project level and verify that the overall phasing looks reasonable. Labor hours will typically fluctuate by the accounting calendar in 5 week months.
 - d. Look at the to-go future BCWS and ETC periods only.
 - e. This trace is to be performed for 3 consecutive reporting periods, with the last being the most current period in the data call.
 - f. There must be no unjustified anomalies.
2. Evaluate the overall manpower profile for LOE labor budget spreads.
 - a. Obtain the accounting calendar. Note any 5 week or longer duration months, if any. Accounting calendars typically end on a specific day of the week, e.g., an accounting calendar may follow the 4-4-5 pattern of 4 weeks, 4 weeks, and then 5 weeks.
 - b. For LOE labor CAs/WPs verify that the hours are not planned flat across the PoP. LOE should be planned according to the accounting calendar and peak in longer accounting months, if any.
 - c. While LOE does not have to be level loaded, i.e., the same amount of budget in every month, evaluate the monthly budgets against the planned work activities for realism. These are typically routine type activities and should be relatively flat.
 - d. There must be no anomalies.
 3. Verify the CA time-phased BCWS equals the CA BAC.
 - a. $X = \$ \text{ value of CAs where sum of all BCWS} \neq \text{BAC}$
 - b. Tolerance = 0
 4. Verify the SLPP time-phased BCWS equals the SLPP BAC.
 - a. $X = \$ \text{ value of SLPPs where sum of all BCWS} \neq \text{BAC}$
 - b. Tolerance = 0

Interview Questions

1. CAM: Please show us your ETC resource plans. Can you provide evidence that the resources are adequate to perform the remaining scope? Are any significant spikes/dips justifiable?
2. CAM: Please show us your baseline resource plans. Can you provide evidence that the resources are adequate to perform the remaining scope? Are any significant spikes/dips justifiable?

8.A.7 Do CAMS approve the CA planning?

Discussion

CAMs are responsible for the execution of accomplishing the scope of work in the CA. CAMs may have assistance in developing the planning of the CA, but they are expected to be in full agreement with the resource profile and time phased plan as meeting the authorized scope. In all cases the CAM must approve the baseline for the CA.

Approval may be formal or informal. The key aspect is concurrence with the final baseline. This includes both the scope, schedule and budget baseline. This could be an email, meeting documentation, separate document, change control references or any other repeatable and sustainable method of documenting CAM approval of the CA planning.

There is an aspect to this QE LOI that applies to CAM turnover. A new CAM to an existing CA must be given the opportunity to review the CA and approve the plan, and be able to update the risks if any of achieving the baseline plan. As a minimum the new CAM must be able to update the ETC to create a realistic ETC/EAC they believe is achievable.

Impact of Noncompliance

Lack of CAM approval invalidates the CAMs role in earned value.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

None

Interview Questions

1. CAM: Did you approve the final baseline planning for the CAs you are responsible for? Show me how this is demonstrated.

8.A.8 Has the prime contractor CAM reviewed and approved the integrity of the subcontractor's PMB?

Discussion

The prime is ultimately responsible for all the scope in the project including all subcontracted effort. The prime typically assigns a CAM who is responsible for managing the subcontracted effort or effort from a subcontractor is part of a CA for which a CAM is responsible. In either case, the CAM must review and approve of the sub's plans.

Approval may be formal or informal. The key aspect is concurrence with the final baseline. This includes both the scope, schedule and budget baseline. This could be an

email, meeting documentation, separate document, change control references or any other repeatable and sustainable method of documenting CAM approval of the CA planning.

Impact of Noncompliance

Lack of approval of baseline subcontractor plans means a significant portion of PMB is not approved or consistent.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the WBS elements with subcontracted work
 - a. Obtain the EOC code for subcontract.
 - b. Sort the electronic CAP by the subcontract code.
 - c. All CAMs with subcontracts must be able to answer the interview question below.

Interview Questions

1. CAM: Have you approved the subcontractor baseline? How is this documented?

8.A.9 Are Control Accounts and WPs opened and closed consistent with the actual start and completion as stated in the IMS?

Discussion

As CAs and WPs are scheduled to begin, the CAs are authorized by the PoP as documented in the work authorization and WP start dates. Similarly, a WP completion date supports the completion date of the CA.

Actual cost charged to a CA after the CA has been closed is inconsistent and potentially understates both cost variance and EAC. When work is stated 100% complete, the applicable charge numbers for that labor scope should be closed (it is recognized the charge number may need to remain open for lagging costs ((estimated actuals reported) and/or rate changes for final yearend reconciliation). The CAM remains responsible for the current EAC until final closure. Except for CAM approved cost transfers, labor hours should not be charged to CAs with total performance completed.

Impact of Noncompliance

Resources are not aligned with project deliverables placing timely completion of project goals at risk.

Verification Steps

Data Analysis (Automatable)

1. X = Number of CA actual start and finish dates in IMS that do not match the fiscal period open and/or close dates in the EVM Cost Tool data / Y = Total # of CA in-progress or complete.
Pass: $X/Y = 0$
Fail: $X/Y > 0$
2. X = Number of WP actual start and finish dates in IMS that do not match the fiscal period open and close dates in the EVM Cost Tool data / Y = Total # of WP in-progress or completed.
Pass: $X/Y = 0$
Fail: $X/Y > 0$

Artifact Traces between Documents

1. Confirm WP IMS start and actual completion with charge number open and close dates. using the charge number reports, compare open and closed charge numbers with the associated WP in the IMS.
 - a. Check the IMS Data Dictionary for a charge number field, if available.
 - b. In the forecast IMS, filter for WP using the WBS or WP field, or the charge number field as available.
 - c. Using the Start field, filter for WP having an actual start (appended with an A as in 11-Jun-14 A).
 - d. Compare these WP start dates with the charge number report open start date.
 - e. From this filtered view compare any WP actual finish dates (appended with an A) with the charge report corresponding close date.
 - f. Check process documentation for open and close of charge numbers, and note any documented process that would cause discrepancies in posted date integration between the cost and schedule data.
 - g. This trace is to be performed for 3 consecutive accounting periods, with the last being the most current closed accounting period in the data call.
 - h. Document all discrepancies as compliance concerns

Interview Questions

None

8.A.10 If an OTB/OTS has been approved and implemented, has the work authorization been changed to reflect the OTB/OTS values?

Discussion

When an OTB/OTS has been approved and implemented, the work authorization documentation for the affected CAs must be changed and approved to reflect the amount of the over target budget. Note to remember: An OTB/OTS must be approved by the DOE Federal Project Director (FPD) in coordination with the contracting officer before implementation.

Impact of Noncompliance

Failure to properly amend and approve the work authorization documentation will result in a poorly planned OTB/OTS and subsequent baseline.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify any BCP DOE modifications, OTB/OTS notification/request for approval, and WADs reconcile to the latest TAB.
 - a. Verify the RAM has been updated for the OTB
 - b. Review WADs for 10 CAs affected by the changes, and make sure they have been updated to reflect the current values in the RAM.
 - c. This trace is to be performed for 3 consecutive reporting periods, with the last being the most current reporting period in the data call.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

8.A.11 Has OTB/OTS had prior customer approval?

Discussion

A thorough analysis of project status is necessary before the consideration of the implementation of an OTB and/or OTS. While EIA/748-C states the customer must be notified, the DOE (as well as DoD) requires advance notification and customer approval before the OTB/OTS implementation. An OTB/OTS must be approved by the DOE FPD in coordination with the CO. Advance notification to the appropriate parties and DOE approval is essential prior to the implementation of an OTB/OTS. It is important to ensure that both internal management and the DOE customer have an understanding of the OTB/OTS's impact on the performance measurement metrics.

When the contractor and DOE project managers/directors are satisfied that the new baseline represents a reasonable plan for completing the project, the new baseline

becomes the basis for future performance measurement. The new OTB/OTS should be consistent with the latest comprehensive EAC.

Implementing an OTB and/or OTS does not change the terms and conditions of the contract but merely serves to improve management of the remaining work.

Impact of Noncompliance

Failure to submit a request for DOE approval before the implementation of an OTB/OTS could result in an untimely OTB/OTS and an unrealistic baseline plan for performance measurement.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Examine for the existence of an OTB/OTS
 - a. Review the CBB log for any instance of an OTB/OTS.
 - b. Review the electronic CAP to the CBB log. The BAC in the CAP that is different than the PMB value in the CBB log indicates an OTB/OTS is in place.

If an OTB is in place then the following interview questions should be asked.

Interview Questions

1. Contractor Project Director: Has the OTB/OTS been approved by the FPD? Was it approved before the implementation? How was it documented?
2. DOE FPD and CO: Did you approve the OTB/OTS? Was it approved before the implementation? How was it documented?

8.B Subsection - Summary Level Planning Packages (SLPPs)

There may not be sufficient visibility to detail plan all the scope at the onset of the project. If the scope has been authorized to a CA, a planning package would be used to plan that segment of work that has not yet been divided into WPs. If the scope has not yet been authorized to the CA level, a SLPP can be used to plan the effort. Both PPs and SLPPs are logically linked in the IMS, however claiming progress (BCWP) against them is not allowed as they are not planned in detail.

The guideline is further defined by QE LOI shown below.

8.B.1	If any, do all SLPPs have scope, schedule, and budget defined?
8.B.2	Are SLPPs controlled and time phased to accurately reflect the anticipated accomplishment of the effort planned?
8.B.3	Are SLPPs converted to Control Accounts as soon as definable and beyond the freeze period?
8.B.4	Does the contractor prevent future budget from being used to change the budget of current work or to and offset schedule/cost variances?

QE LOIs Repeated With Discussions

8.B.1 If any, do all SLPPs have scope, schedule, and budget defined?

Discussion

SLPPs are for future effort that have not been identified to a CA. They are higher level planning accounts above the CA level that identify scope, schedule and associated budget (resources) through the end of the project. The budget for this effort must be based on resource requirements identified specifically to the work for which it is intended, be time-phased, as necessary, for accurate rate application, have its value periodically assessed, and have controls established to ensure this budget is not used in performance of other work. As with CAs, a responsible manager must be assigned to monitor and maintain these summary level efforts. SLPPs will be subdivided into CAs at the earliest opportunity. Planning horizons may be used to determine the appropriate time period in which to convert SLPPs into CAs. As work included in an SLPP draws closer to time-now, or as work definition becomes clearer, the contractor must convert the SLPP into CAs. This concept is a component of what is called the “rolling wave” approach to planning.

The maintenance of realistic budgets, directly tied to an established scope of work, is essential for all project effort. Eventually, all of the work must be planned to the CA level prior to performance.

Impact of Noncompliance

Lack of scope, schedule, and budget integration invalidates the PMB.

Verification Steps

Data Analysis (Automatable)

1. $X = \#$ of SLPPs without integrated time phased schedule and budget
Pass: $X = 0$
Fail: $X > 0$

Artifact Traces between Documents

1. If used, verify all SLPPs are documented and time phased for future use.
 - a. Using the SOW, WBS Dictionary and RAM, search for any confirmed SLPPs and evaluate the scope of the SLPPs.
 - b. Using the EV Cost Tool data, filter for SLPPs to determine the budget of any SLPPs.
 - c. Using the IMS Data Dictionary, determine how SLPPs are defined in the schedule.
 - d. Using the baselined IMS, filter for SLPP based in the information in the IMS Data Dictionary, and check for schedule timing and duration of the package.
 - e. This trace is to be performed for 3 consecutive periods, with the last being the most current period in the data call.
 - f. Document all discrepancies as compliance concerns

Interview Questions

None

8.B.2 Are SLPPs controlled and time phased to accurately reflect the anticipated accomplishment of the effort planned?

SLPPs are for future effort that have not been assigned to a CA. They are higher level planning accounts above the CA level (but at the lowest WBS level possible above the CA) that identify scope, schedule and associated budget (resources) through the end of the project. The budget for this effort must be based on resource requirements identified specifically to the work for which it is intended, be time-phased, as necessary, for accurate rate application, have its value periodically assessed, and have controls established to ensure this budget is not used in performance of other work. The IMS reflects the schedule (or time phasing) of SLPPs to include significant project events, milestones and deliverables. SLPPs also have resources planned in support of project goals and objectives. Because SLPPs have not yet been authorized to be part of a CA to start work, the PM or intermediate OBS or WBS manager is responsible for managing them. The CAM becomes responsible when the SLPPs are transferred to a CA.

Impact of Noncompliance

Project planning will be incomplete, increasing the risk of accomplishing contractually required deliverables on time.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify SLPP time-phased BCWS equal BAC.
 - a. $X = \$ \text{ value of SLPPs where time-phased BCWS} \neq \text{BAC}$
 - b. Tolerance = 0

Interview Questions

1. SLPP Manager: Please discuss the basis for the resource and time phasing of the SLPP(s).

8.B.3 Are SLPPs converted to Control Accounts as soon as definable and beyond the freeze period?

Discussion

Enough knowledge and visibility should be available to allocate SLPPs to CAs within 90 days of when work is to start. This is a recommendation. As a minimum the SLPP would need to be converted to a CA and WP no later than the freeze period.

Impact of Noncompliance

Excessive high level plans in the near term horizon jeopardizes the successful execution of the PMB.

Verification Steps

Data Analysis (Automatable)

1. $X = \# \text{ of SLPPs with actual dates and performance}$
Pass: $X = 0$
Fail: $X > 0$

Artifact Traces between Documents

1. $X = \# \text{ of SLPPs in planning window as established by the contractor SD in advance of the baseline or forecast start date.}$
Pass: $X = 0$

Fail: $X > 0$

Interview Questions

None

8.B.4 Does the contractor prevent future budget from being used to change the budget of current work or and offset schedule/cost variances?

Discussion

Reducing or eliminating cost variances by moving budget from the scope of future work to current work or within the current period is not allowed. This is the equivalent of moving the budget (all or partial) without moving the associated work scope or adjusting the time phasing of the activity that the budget was assigned to. Scope, schedule and budget stay together as a baseline for performance measurement.

Movement of scope, schedule, and budget together is not a concern in the interpretation of this QE LOE.

Impact of Noncompliance

Moving budget without scope destroys the integrity of the PMB, rendering performance measurement data unreliable for decision making. .

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Manual check of SD regarding the controls on far-term budgets.
 - a. Verify the process documentation outlines an approach to formally control the movement of budget for future work so that it is not used for near-term activities.
 - b. Document all discrepancies as compliance concerns
2. Verify the amount of changes within the current period for the last six reported periods at the total project level. .
 - a. Tolerance is $\leq 3\%$ of all baseline changes for six periods

Note: This test is to see if additional information on-site is necessary.
Problems include:

- Movement from out periods to the current

- Excessive increases in the current period
- Continual movements each month

Interview Questions

None

Guideline 8 – PMB Typical Artifacts Common to the QE LOIs

- Baseline and forecast IMS
- Electronic CAP by EOC
- IPMR/CPR Format 1
- EVM Cost Tool
- DOE Budget/Baseline Change Documentation (Budget Change Proposals (BCPs), Budget Change Requests (BCRs), etc.)
- Accounting Calendar
- PARSIIIE reports
- EVM SD
- WADs
- Logs
- OTB Approval Document (if applicable)

Guideline 9 - Authorize and Budget by Cost Elements

Establish budgets for authorized work with identification of significant cost elements (labor, material, etc.) as needed for internal management and for control of subcontractors.

This guideline is further broken out into subsections for clarification.

- Work Authorization
- Elements of Cost (EOC)
- WP Budgets

Work Authorization: requirements for work authorizations

EOC: how EOCs are used

WP Budgets: application of budgets

9.A Subsection - Work Authorization

Through a formal work authorization process, the budget's EOCs required to execute the CA's scope of work are identified, planned, and documented. Formally authorizing the work ensures the assignment of program/project work scope to the responsible organization is clearly documented and the resources required for completing the work are budgeted and acknowledged by the management team.

The guideline is further defined by QE LOI shown below.

9.A.1	Does Work Authorization documentation identify scope of work, budget by element of cost, and period of performance?
9.A.2	Is the CA scope defined at the level necessary for execution of the work?
9.A.3	Are work authorization dates consistent with control account baseline dates in the IMS?
9.A.4	Are Work Authorizations consistent with the OBS levels of responsibility?
9.A.5	Does the contractor require that work scope, schedule, and budget are authorized before the work is allowed to begin and actual costs are incurred?

QE LOIs Repeated With Discussions

9.A.1 Does Work Authorization documentation identify scope of work, budget by element of cost, and period of performance?

Discussion

The contractor's formal work authorization process requires technical scope, schedule and budget by EOC, to be clearly identified in the WAD. This ensures both project management and the CAM have an agreement regarding the scope that must be accomplished, time period to execute and resources available to do the effort at the right

time. Budget is established for work scope which is then further planned by the EOCs for labor, material, subcontractor, and other direct charges required to accomplish it.

Impact of Noncompliance

Inadequate work authorization increases the risk of unauthorized work and cost overrun.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm the WAD identifies the scope of work.
 - a. Select a sample of 10 CAs.
 - b. For each selected CA, using the WAD, the SOW or WBS Dictionary, as needed; determine if the scope of work is fully identified on the WAD.
 - c. For the same WBS the scope should be identical or expanded in the WAD as compared to the SOW/WBS Dictionary.
 - d. This trace is to be performed for 3 consecutive periods, with the last being the most current period in the data call.
 - e. Document all discrepancies as compliance concerns
2. Confirm the WAD identifies the budget by Element of Cost (EOC).
 - a. Using the WAD, confirm budget is broken down and authorized by EOC.
 - b. This trace is to be performed for 3 consecutive periods, with the last being the most current period in the data call.
 - c. Document all discrepancies as compliance concerns
3. Confirm the WAD identifies the PoP.
 - a. Using the WAD, confirm the PoP is identified
 - b. This trace is to be performed for 3 consecutive periods, with the last being the most current period in the data call.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

9.A.2 Is the CA scope defined at the level necessary for execution of the work?

Discussion

This QE LOI looks at the level of work authorization scope definition. The CA scope needs to be defined to a level that the work is performed, including specific descriptions of work deliverables. Typically this work definition should include assumptions,

references to BOEs, and exclusions as necessary to fully document the scope. From the CAM perspective this scope definition is used as the basis for later justification of baseline changes, requests for MR, and variances because of inadequate definition.

Impact of Noncompliance

Inadequate work authorization increases the risk of not completing required work, performing unauthorized work and cost growth.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review 10 CA WADs and related WBS Dictionary for adequate scope
 - a. The scope for the CA is either in the WAD itself or the WBS Dictionary if taken to the CA level.
 - b. Review the depth of the scope. Is it sufficient detail?

Interview Questions

1. CAM: Please describe the work you are responsible for in this CA and where it is documented. (Compare with 1.b above).
2. CAM: How do you measure scope changes to the CA, if any?

9.A.3 Are work authorization dates consistent with CA baseline dates in the IMS?

Discussion

The IMS includes discrete baseline start and completion dates for CAs. The WAD must also contain these same dates to ensure the baseline schedule represents only authorized periods of performance (the same dates). Guideline 3 refers to subsystem integration which requires the contractor's systems to reflect the same data.

Impact of Noncompliance

Lack of integration with work authorization could cause unauthorized work to be planned in the IMS.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the CA WAD baseline dates correspond to CA baseline dates in the IMS.
 - a. For 10 discrete CAs, using the WAD and the IMS, compare the PoP dates on the WAD with the baseline start and finish dates in the IMS.
 - b. This trace is to be performed for the most current period in the data call.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

9.A.4 Are Work Authorizations consistent with the OBS levels of responsibility?

Discussion

Work authorizations must be integrated and flow through the OBS. If the OBS defines intermediate managers between the PM and the CAM for example, work authorization is required from the PM to the intermediate manager and from the intermediate manager to the CAM.

Impact of Noncompliance

Lack of integration between work authorization and the OBS means the work may not be assigned to the responsible manager and at the correct level for project performance.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm the CA WAD includes the level of authority for the OBS assigned to the CA.
 - a. Verify the CA WAD and OBS reflect the levels of responsibility necessary to authorize the resources required for the work effort
 - b. Compare the organizational charts, the RAM WBS/OBS and the WAD to determine if the CAM has access to the functional resources needed to accomplish the work.
 - c. This trace is to be performed for 3 consecutive periods, with the last being

- the most current period in the data call.
- d. Document all discrepancies as compliance concerns

Interview Questions

None

9.A.5 Does the contractor require that work scope, schedule, and budget are authorized before the work is allowed to begin and actual costs are incurred?

Discussion

Approved WADs must precede the baseline start and actual start of work. No work shall begin before work scope, schedule and budget are formally authorized by WADs. This is a control function to ensure costs are controlled in a systematic manner.

Impact of Noncompliance

Unauthorized expenditures prior to formal work authorization may result in cost overruns and work being performed out of sequence to the baselined schedule.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify authorization date is not after the budgeted baseline start.
 - a. $X = \$ \#$ of incomplete CAs where the budget baseline start is before the start date on the WAD.
 - b. Tolerance = 0
2. Verify the WAD date is prior to the occurrence of actuals.
 - a. $X = \$$ value of actual cost occurring prior to the accounting period authorization date for incomplete CAs
 - b. This test may also be done by comparing the Work Authorization and the electronic CAP. Filter the CAP by CA and then verify the first ACWP was after the approval date of the WAD.
 - c. Tolerance = 0

Interview Questions

None

9.B Subsection - Elements of Cost

Elements of cost (EOC) are a subset of the CA and WP budgets. Initially, the BOE was developed and broken out by EOC to provide enough detail for resource planning. EOC budgets found in the WAD are direct descendants from the BOE. EOCs may vary by contractor as they are controlled by company accounting practices.

The guideline is further defined by QE LOI shown below.

9.B.1	Within control accounts, are budgets segregated and planned by element of cost (e.g. direct labor category, direct labor dollars/hours, material and/or subcontract dollars, and other direct costs)?
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QE LOIS repeated with discussions

9.B.1 Within control accounts, are budgets segregated and planned by element of cost (e.g. direct labor category, direct labor dollars/hours, material and/or subcontract dollars, and other direct costs)?

Discussion

Budgets are established by EOC: direct labor, subcontractor, material, and other direct costs (See Guideline 13 for establishing indirect budgets). Budgets may be stated in dollars, hours, or other measurable units consistent with the budget values reflected in the CAPs and the latest WADs.

Impact of Noncompliance

Lack of planning by EOC results in poor resource plans and potential future resource conflicts.

Verification Steps

Data Analysis (Automatable)

1. $X = \#$ of incomplete CAs with budgets not segregated by element of cost
Pass: $X = 0$
Fail: $X > 0$

Artifact Traces between Documents

None

Interview Questions

None

9.C Subsection - WP Budgets

The formal work authorization process extends from the project level to the CA. Budgets for WPs within the CA are the responsibility of the CAM. The BOE developed for the project during the proposal phase is typically used as the basis for development of the WP budgets as details by EOC are found in this document. The WP budgets plus planning package budgets (if any) must sum to equal the CA budget. Material budgets should be based on the defined/expected quantities needed to meet the requirement and the need date (the Bill of Material (BOM) is typically the basis of the budgets). Budget for authorized subcontractor work is based initially on the prime contractor's estimated value and must be updated to reflect negotiations. Authorized subcontracted work must be integrated into the prime contractor's PMB.

The guideline is further defined by QE LOI shown below.

9.C.1	Are budgets assigned to major responsible functional elements (normally in a dollarized RAM)?
9.C.2	Are budgets at the WP level in dollars? If not, are they converted to dollars for rollup and reporting purposes?
9.C.3	Are all material budgets relatable to the proposal (prior to authorization), the bill of material BOM, or other acceptable budgeting documentation?
9.C.4	Are budgets for subcontract work consistent with BOEs and/or negotiations at the time of establishment?

QE LOIS REPEATED WITH DISCUSSIONS

9.C.1 Are budgets assigned to major responsible functional elements (normally in a dollarized RAM)

Discussion

In guideline 2 a responsible OBS was developed. This QE LOI verifies that the budget is allocated according to the OBS. This normally must be accomplished soon after award and updated whenever the CA has a change. The dollarized RAM is developed showing the budgets assigned to CAMs and the work scope to be completed (per the WBS).

Impact of Noncompliance

Lack of budget flow through the OBS can inhibit responsible functional leadership from management of the project.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the dollarized RAM shows budgets assigned to major functional elements, per the OBS, to the CAM.
 - a. $X = \#$ of incomplete CA with budgets not assigned to a major functional element (OBS)
 - b. Tolerance = 0

Interview Questions

None

9.C.2 Are budgets at the WP level in dollars? If not, are they converted to dollars for rollup and reporting purposes?

Discussion

Budgets are typically planned in hours for labor elements, dollars for other direct costs, and quantities for material elements. Material WPs may be initially planned as yards of concrete, tons of steel, etc. However, all WP budgets must be converted to dollars through the application of standard labor rates, material unit prices, etc. Overhead and other indirect rates (approved, provisional, or proposed) are also applied as appropriate for the inclusion of indirect components of WPs. WP budgets are then rolled up to the CA level and included in performance reports.

Impact of Noncompliance

Failure to be able to rollup costs by dollars will prohibit reconciliation with the PMB or compliance with other QE LOIs requiring WBS and OBS rollup.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm the RAM shows budgets assigned in dollars or with a dollar conversion.
 - a. Conduct a manual check of the RAM to confirm budgets are assigned in dollars or shown with a dollar conversion (dollarized).
 - b. Document all discrepancies as compliance concerns

2. Select 10 CAs and review the details for each WP in the EVM Cost Tool output. Are the totals for all WPs shown in dollars?
 - a. Document all discrepancies as compliance concerns

Interview Questions

None

9.C.3 Are all material budgets relatable to the proposal (prior to authorization), the bill of material (BOM), or other acceptable budgeting documentation?

Discussion

Initially, material budgets should be developed in a BOE at CD-2 and are included in a BOM that reflects the authorized material quantity and unit cost. Material budgets in the WAD are a result of the BOEs and should be reconcilable to them. There may be some differences such as changes in negotiations, adjustments for MR, or changes in material requirements, but traceability is necessary. Typically the BOM is annotated for the difference between the BOE and budgeted value so that as items are procured, the potential EAC impact can be readily identified from the BOM unit price and quantity as compared to the PO unit price and quantity. This is required to support price usage requirement for high dollar value material in Guideline 21.

Impact of Noncompliance

Inconsistencies between material budgets and the BOM may mean unauthorized procurements leading to cost overruns.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify WPs with material budgets are consistent with the BOM or the proposal.
 - a. Using the electronic CAP find all CAs with material budget.
 - b. For 10 CAs containing material budgets, using the WAD, compare the WP material budgets against the BOM and the proposal as needed, including any changes to requirements.
 - c. X = # of incomplete WP with material budgets not consistent with the BOM or the proposal
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

9.C.4 Are budgets for subcontract work consistent with BOEs and/or negotiations at the time of establishment?

Discussion

Authorized subcontracted work must be integrated into the prime contractor's PMB. The budgets in the WAD and CAs should reflect the latest information available regarding negotiations with the subcontractor. If the contract between the prime and subcontractor has not yet been definitized, the budget in the WAD must reflect the CAM's best estimate of what the budget will be upon definitization.

There are neither requirements nor expectations that the prime contractor apply management reserve to differences in the negotiated subcontract budget at the time of baseline establishment. If MR is used, the budget for subcontracted work may be consistent with the negotiated subcontract budget. The prime contractor should always establish a realistic baseline for the subcontractor at the time the baseline is established. Guideline 29 does allow for a one-time adjustment of subcontractor baselines using MR at the time the subcontract is initially negotiated.

Impact of Noncompliance

Subcontract budgets inconsistent with BOEs and/or negotiations are not achievable and lead to cost overruns.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Compare the subcontract with the PMB BAC for the subcontractor scope
 - a. Review the subcontract for schedule and cost targets/requirements
 - b. Review the prime CA(s) BAC for the same subcontract.
 - c. Is the subcontract BAC consistent with the sub's contract flow down?
 - d. Document all discrepancies as compliance concerns

Interview Questions

1. CAM – Please explain the difference, if any, between the subcontract budget and

the BAC in the prime EVM Cost Tool.

Guideline 9 – Work Authorization Typical Artifacts Common to the QE LOIs

- Baseline and forecast IMS
- Electronic CAP by EOC
- WADs
- OBS/RAM
- Actual costs time phased
- PMB
- BOM
- Resource plans
- Material requirements documentation identifying when the material is expected to be used
- Subcontractor schedules
- IPMR/CPRs
- Change control documents
- MR/UB/CBB log(s)
- Latest contractual document or modification identifying current contract cost and AUW
- SOW for AUW

Guideline 10 - Determine Discrete Work and Objective Measures

To the extent it is practicable to identify the authorized work in discrete WPs, establish budgets for this work in terms of dollars, hours, or other measurable units. Where the entire control account is not subdivided into WPs, identify the far-term effort in larger planning packages for budget and scheduling purposes.

This guideline is further broken out into subsections for clarification.

- WP Planning: how to plan and manage WPs
- WP Status: how to status relative to the EVT
- PPs: how to plan and manage PPs

10.A Subsection - WP Planning

Effort contained within a CA is distributed into either WPs or PPs. WPs are the manageable units of work that must be accomplished in order to fulfill the contractual goals and deliverables on the project. The resources assigned to WPs are to be time-phased the way the detail work is to be accomplished. The selection of appropriate EVTs will allow for accurate and objective performance measurement. WP descriptions and titles must clearly distinguish one WP effort from another. The schedule may have more detail below the WP/planning package level to support the development of a realistic critical path, as applicable.

The guideline is further defined by QE LOI shown below.

10.A.1	Do discrete WPs have durations limited to a relatively short span of time that is practical for the work scope, unless supported by objective interim measures such as points of technical achievement to enable accurate performance assessment?
10.A.2	Are WPs defined at the level where the work is performed and is each WP assigned to a single organization?
10.A.3	Do WPs and planning packages represent the total scope of the control account?
10.A.4	Are Budgets or Values Assigned To WPs and Planning Packages in Terms of Dollars, Hours, or Other Measurable units that are consistent with project requirements?
10.A.5	Are WP and Planning Package budgets traceable to the basis of estimate (cost estimate), as modified by project definitization, project changes, and approved baseline changes?
10.A.6	Are WPs assigned EVTs consistent with the SD and work nature of the planned work?
10.A.7	Are WP exit or completion criteria defined?
10.A.8	Are WPs clearly distinguishable from all other WPs including the titles being unique and consistent with the scope of the WP?

10.A.9	Are WPs planned as far into the future as practical?
10.A.10	Is HDV material segregated from other elements of cost, planned in support of the need dates for the material items, and time-phased by dollar amount suitable for the type of material category
10.A.11	Are the EVT's for material consistent with the manner in which material is planned?
10.A.12	Is subcontract effort identified (as applicable) and time-phased consistent with subcontractor baseline plans?
10.A.13	Are all WPs assigned scope, schedule, and budget?

QE LOIs Repeated With Discussions

10.A.1 Do discrete WPs have durations limited to a relatively short span of time that is practical for the work scope, unless supported by objective interim measures such as points of technical achievement to enable accurate performance assessment?

Discussion

Discrete work is defined as a specific product or service with distinct and measurable outputs that are relatable to the project's technical objectives. These measurable outputs are where project status can be measured objectively. Examples of measurable products or outputs include design efforts, a tool design package, a build-to-package, a shop order, a part number, a purchase order, or any other definable product.

The objective of a WP is to plan, execute, and complete a distinct portion of the scheduled scope, moving on to the next logically driven sequence of scope/WP. This is most effectively accomplished by planning the work in small, manageable segments which provides for a more accurate objective measurement of progress as task execution is measured at this working level. Planning the work in small, manageable segments provides for a more accurate objective measurement of progress as task execution is measured at this working level. WP and planning package quantities, sizes and durations within a control account will vary subject to scope, internal management needs, and the size and complexity of the contract.

The expectation is that WPs in the detail planning period should be 44 working days or less in duration. This is to support quantitative earned value assessment and to have executable detail for the current periods. WPs are to be at the performance level. The 44 working days represents two accounting months according to most accounting calendars. Discrete WPs may be longer than 44 working days when supported by interim measures. The expectation is these measures come in two parts:

1. Within the IMS, supported by activities around 20 working days or less, consistent with how the work is performed. Note that the critical path is

- developed at the activity level so granularity of about 1 working month is desired for longer work packages.
2. With QBDs to justify the earned value assessment monthly or consistent with how the work will be performed.

Impact of Noncompliance

The ability to measure progress objectively is diminished which increases the potential for significant variances. Additionally, long duration WPs (greater than 44 working days) impact the CAM's flexibility in planning once the effort has started.

Verification Steps

Data Analysis (Automatable)

1. $X = \#$ of incomplete WP work packages with baseline duration greater than 44 working days, excluding LOE $Y = \text{Total \# of incomplete work packages}$
Pass: $X/Y \leq 5\%$
Fail: $X/Y > 5\%$

[Note – Failure of this metric is not a finding. Continue to the next artifact traces to see if there is an issue.

Artifact Traces between Documents

1. Take the results from the automated test for this QE LOI.
 - a. Select 10 for review and, unless objective interim documentation has been provided, follow up on this listing during the interview.
 - b. $X = \#$ of incomplete work packages with "at completion" durations in excess of 44 working days without QBD
 - c. Tolerance = 0

Interview Questions

1. CAMs: For WP activity(s) WPxx, show how interim performance is taken. (Follow up to Artifact Traces between Documents with activities identified for review in an interview).

10.A.2 Are WPs defined at the level where the work is performed and is each WP assigned to a single organization?

Discussion

WPs are single activities that may be supported by multiple activities assigned to a performing organization for completion and are natural subdivisions of the control account work scope having a definable end product or event. WPs are developed to reflect how the work will be executed and technical progress will be measured at the level where work is performed. This provides an effective approach to planning, measuring progress, accruing cost for variance analysis and reporting a valid EAC to DOE.

The DOE Interpretation of the single performing organization requirement is as follows. Work teams, defined as resources under the direction of a single lead, are considered a single performing organization for the purposes of the QE LOI.

As stated in QE LOIs 10.A.1 and 10.A.3 there is an inter-relationship between this QE LOI and the others.

Impact of Noncompliance

Failure to identify WPs at the performance level can result in an ineffective baseline for performance measurement.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Select a sample of 3 or more significant open CAs and review the WPs' scope in the WBS Dictionary.
 - a. Determine the contractor's unique coding structure for integration by WBS and OBS.
 - b. Pull a report from the EVM Cost Tool that shows the performing organizations for each WP. Verify there are no WPs with more than one performing organization unless further verification indicates a work team.
 - c. Trace the WP to the IMS activities and EVM Cost Tool CAP. Review the schedule activities. Are the titles in the IMS indicative of work at the performance level? If not then the QE LOI intent has not been met.
 - d. Otherwise verify with the CAM that a work team is performing the work. If so then step B above is met.
 - e. Document all discrepancies as compliance concerns

Interview Questions

None

10.A.3 Do WPs and planning packages represent the total scope of the control account?

Discussion

Effort contained within a control account (CA) is distributed into WPs (WPs) and PPs (PPs) and segregated by elements of cost. WPs are planned in detail at the outset and are for near term effort while PPs are aggregates of future activities and resources beyond the detail near term plan. Both WPs and PPs have time-phased resources that must be supported by a defined scope of work. The combination of these two elements represents the entire CA scope of effort.

Impact of Noncompliance

WP and PP scope, budgets and resource requirements will be inaccurate. Planning will not reflect the correct work scope and may adversely impact the CAMs' ability to complete the effort.

Verification Steps

Data Analysis (Automatable)

1. Determine in the EVM Cost Tool, whether the sum of the budgets for the WPs and PPs equal the BAC for the CA.
 - a. $X = \text{Sum of WP and PP budgets} - \text{BAC CA}$
Pass: $X = 0$
Fail: $X \neq 0$

Artifact Traces between Documents

1. Select a sample of 4 significant discrete CAs.
 - a. Verify in the EVM Cost Tool and CAPs that the total budget for the WPs plus PPs equals the budget for the control.
 - b. For those same WPs, PPs and CAs, verify that the WBS dictionary and WAD scope narratives are consistent.
 - c. Document all discrepancies as compliance concerns
2. Using the same CAs, review the exit criteria for the WPs. Verify that the WP and PP exit criteria are consistent with the WAD scope for the CA.

Interview Questions

None

10.A.4 Are Budgets or Values Assigned To Work Packages and Planning Packages in Terms of Dollars, Hours, or Other Measurable units that are consistent with project requirements?

Discussion

Budgets established at the WP (WP) level identify specific resource requirements in dollars, hours, or other measurable units for detail “near term” planning. PPs are aggregates of future activities and resources beyond the detail plan or “near term” that must be divided into WPs at the earliest point in time when detail work content is known. The time-phased resources assigned to the PPs must be supported by a specified scope of work and this relationship must be maintained when detailed planning of the effort occurs. The PP budgets must also be identified in dollars, hours or other measurable units. These WP and PP budgets must provide sufficient detail to support the effective execution of the baseline plan.

If the detail is not in dollars the project must document how the effort is priced to create BCWS. The hours or other measureable units must be converted to dollars before it is summarized to the control account level. See QE LOI 9.C.2 for requirement to convert the budget to dollars for rollup.

Impact of Noncompliance

Failure to maintain the link between the work scope and budget results in a PMB that is not integrated or able to be properly executed.

VERIFICATION STEPS

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Select 3 discrete CAs and perform a manual check to verify the EVM Cost Tool data and CAPs (CAPs) are consistent in budget denominations assigned to WPs and PPs in support of project plans.
 - a. Confirm for dollars, hours or other measureable units
 - b. Confirm that units used internally are consistent with external reporting on the IPMR/CPR Format 1
 - c. There should be no discrepancies.

Interview Questions

1. CAM: How are the WPs planned? If not dollars, how do you verify they are consistent with project requirements?

10.A.5 Are WP and Planning Package budgets traceable to the basis of estimate (cost estimate), as modified by project definitization, project changes, and approved baseline changes?

Discussion

There was an initial basis of estimate (BOE) developed in support of the proposal which must reconcile to the current budget allocated to WP/PPs. This reconciliation will include changes caused by project definitization (adjusted in negotiations) and approved baseline changes such as use of MR.

Impact of Noncompliance

Failure to base WP and planning budgets on the initial BOE may result in inconsistent planning and exclusion of authorized work scope.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Select 3 discrete CAs.
 - a. Compare the WP and planning package budgets in the EVM Cost Tool and CAPs (CAPs) with the current BOE to verify they can be reconciled.
 - b. Trace the authorized scope of work in the WAD, WBS Dictionary and BOE to verify it is consistent with the BOE scope, as amended by subsequent negotiations.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

10.A.6 Are WPs assigned EVT's consistent with the SD and work nature of the planned work?

Discussion

In order for the project manager to effectively manage execution of the project within budget and schedule constraints, discrete WPs must be established and objectively measured. Each WP is established using the most appropriate method to budget and then measure its progress toward completion. The EVT is established based on how the work is

planned (Budgeted Cost for Work Scheduled (BCWS)), and how performance will be earned. Based on the nature of the work contained in WPs, an appropriate EVT is identified for measuring work accomplishment.

Impact of Noncompliance

Inaccurate reporting of BCWP causes artificial CVs and SVs, which in turn results in inaccurate EVMS reporting to project management and the DOE.

Verification Steps

Data Analysis (Automatable)

1. Pull a report from the EVM Cost Tool that shows if EVTs are assigned to the remaining WPs to verify all remaining WPs have an assigned EVT.
 - a. $X = \#$ of incomplete WP activities without an assigned EVT
Pass: $X = 0$
Fail: $X > 0$

Artifact Traces between Documents

1. Review the Contractor's EVM SD to determine the EVTs available for use and their requirements.
2. Review the Contractor's EVM SD and procedures (if applicable) to determine how material is identified, classified, and planned. Also determine how EVTs are supposed to be assigned for material WPs.
 - a. Review the IMS, EVM Cost Tool and CAPs (CAPs) and identify the EVTs assigned to remaining material WPs.
 - b. Verify the EVTs are consistent with the type of material planned.
 - c. Verify the EVTs are consistent with the way the material is planned.
 - d. Document all discrepancies as compliance concerns
3. From an EVM Cost Tool report showing EVTs in progress WPs, review the WPs with % complete EVTs.
 - a. Verify a sample of the in-progress WPs have QBDs that justify the % complete EVT.
 - b. $X = \#$ of % complete EVT in-progress WPs >44 days duration sampled with no QBD defined
 - c. Tolerance = 0
4. From that same EVM Cost Tool report identify WPs with apportioned EVTs.
 - a. Verify that activities/WPs with apportioned EVTs have a direct and proportional relationship to a base discrete WP.

- b. Where there is not a one-to-one proportional relationship between the base WP and the apportioned WP, the defined relationship must address how the percent complete of the base discrete work is consistent with the percent complete status of the apportioned effort (i.e. how does the apportioned status mirror that of the discrete work). In other words, how it will mirror a one to one relationship.
- c. $X = \#$ of incomplete WP activities with apportioned EVT's without an identified proportional relationship to a discrete base WP/activity.
- d. Tolerance = 0

Interview Questions

None

10.A.7 Are WP exit or completion criteria defined?

Discussion

Identifying appropriate, objective completion criteria that will align how technical performance will be accomplished is key for accurate measurement of progress (BCWP). These completion criteria may be contained within the control account or WP plans, or at the activity level in the IMS, or in other baseline documentation.

Impact of Noncompliance

WP planning would not align with the intended project goals. Not knowing when the effort is complete leads to cost overruns and schedule delays as well as inaccurate assessment of progress to an unclear end product.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

- 1. Review the IMS detail schedules for the remaining WPs to verify each has completion criteria defined.
 - a. $X = \#$ of incomplete WP activities without SOW/WBS coding in the baseline/forecast IMS
 - b. Tolerance = 0

Interview Questions

None

10.A.8 Are WPs clearly distinguishable from all other WPs including the titles being unique and consistent with the scope of the WP?

Discussion

Work packages should reflect the actual way the work is to be done and should be a clearly distinguishable subdivision of a CA. Each WP must be distinct from other WPs, with each WP containing mutually exclusive work scope and a unique Work package title/ID in the Cost Tool.

Impact of Noncompliance

Confusion in identifying specific WPs leads to inaccurate planning, inefficient expenditure of resources and inaccurate performance measurement. This may also result in invalid EACs reported to the DOE.

Verification Steps

Data Analysis (Automatable)

1. Review WPs in the Cost Tool to verify the WP names and coding are unique and not duplicated.
 - a. $X = \#$ of WP with duplicate names/coding in the Cost Tool
Pass: $X = 0$
Fail: $X > 0$

Artifact Traces between Documents

1. Pull a report from the EVM Cost Tool and select a sample of the significant remaining CAs with WPs identified.
 - a. Review and compare the WBS Dictionary and WAD scope statements with the titles of the WPs in the IMS or EVM Cost Tool to ensure the WP titles and related scope are consistent and not duplicated.
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

10.A.9 Are WPs planned as far into the future as practical?

Discussion

WP planning provides specific identification of resource requirements, durations, dependencies and work scope; the better the detail, the better the plan and execution of the baseline plan. Planning as far into the future as makes sense provides management and the customer with a more meaningful baseline and vision of future effort. Work packages should be detail planned at the earliest practicable point prior to any work being performed and must be planned before entering the freeze period.

In order to solidify the PMB for accurate performance measurement, it is necessary to establish a freeze period. During the freeze period, changes to the PMB are limited to maintain its integrity. The freeze period is defined as the current period plus one month. It should be noted that the process of using PPs for effort that is in the future and determination of when there is enough information to convert PPs into WPs with sound, accurate detail planning is left to the contractor. This also applies to the process of converting summary level PPs (SLPP) to CAs and WPs. This flexibility helps minimize premature planning that is not well aligned with project objectives. The process of converting PPs into detailed WPs is known as rolling wave planning.

Impact of Noncompliance

Work scope cannot be successfully accomplished if it is not detail planned. Waiting too late to perform detailed planning causes inefficiencies in execution and increases the risk of work scope not being completed on schedule.

Verification Steps

Data Analysis (Automatable)

1. Pull a report from the EVM Cost Tool to verify there are no PPs in the freeze period (WPs must be detailed planned before the freeze period).
 - a. $X = \#$ of PPs that have baseline start dates in the freeze period or earlier
Pass: $X = 0$
Fail: $X > 0$

Artifact Traces between Documents

1. From the IMS select a sample of the significant remaining CAs with PPs to verify that no PPs are being detail planned within the freeze period.
 - a. Verify that no PPs are within the freeze period. $X = \#$ PPs that have baseline start dates within the freeze period.
Pass: $X = 0$, Fail: $X > 0$
 - b. Document all discrepancies as compliance concerns.

Interview Questions

1. CAM: Is a rolling wave process used for detailed planning?

2. CAM: What is the timeline for detailed planning and PP conversion prior to the freeze period?

10.A.10 Is HDV material segregated from other elements of cost, planned in support of the need dates for the material items, and time-phased by dollar amount suitable for the type of material category?

Discussion

Material must be segregated from other elements of cost as performance is earned differently. It must be planned in support of the need dates for the material items so that the material will be available when needed. Material is also time-phased by dollar amount based on the type of material. Contractors must conduct an analysis to identify and differentiate categories of material, appropriate planning method, and the associated EVT. This analysis must distinguish between material and subcontracted effort. (See Guideline 21 for further information on material EVTs and HDV definitions).

Impact of Noncompliance

Failure to segregate HDV material would potentially mask material trends and prevent early warning of EAC concerns.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Pull a report from the EVM Cost Tool and select a sample of remaining significant CAs that have material.
 - a. Review the WADs for those CAs to verify that Material is identified and segregated in separate WPs from other elements of cost.
 - b. Review the IMS (if resource loaded) and CAPs (CAPs) to verify that material is time phased by dollar amount
 - c. Ask for a report from the Material Purchasing System that shows need dates and compare to the material planned in the IMS, EVM Cost Tool and CAPs to verify material is planned and time phased in support of those need dates.
 - d. Document all discrepancies as compliance concerns.

Interview Questions

None

10.A.11 Are the EVT's for material consistent with the manner in which material is planned?

Discussion

Material is planned based upon when it is needed. The point of performance must be established no earlier than the actual receipt of the material items but as close as possible to the point of consumption. This prevents the early assessment of progress for material that may ultimately be cancelled and for which earned value would have to be reduced. Other points of progress assessment include release from inventory to work-in-progress, receipt (with inspection and acceptance), and delivery to the user (i.e., for direct delivery material).

High value and/or critical material are planned discretely using objective milestones or other rational basis to measure the amount of material received. If there is no guidance to differentiate between low and high value material, all material must be planned as discrete HDV material requirements. For some low value material (LDV) items, LOE may be the appropriate EVT provided there is company guidance. Another technique called pert cost is preferred to LOE for LDV material but may only be used for LDV material (see pert cost discussion in QE LOI 21.A.7).

The budget must be planned consistent with the point in the material cycle when performance is expected to be claimed. For example, if milestones were set up to claim performance for high value material, then the budget must be planned against these milestones. This alignment ensures a valid measurement of schedule variance.

Impact of Noncompliance

Inaccurate reporting of BCWP causes artificial CVs and SVs, which in turn provide inaccurate EVMS reporting.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the Contractor's EVM SD and procedures (if applicable) to determine how material is identified, classified, and planned. Also determine how EVT's are assigned for material.
 - a. Review the IMS, EVM Cost Tool and CAPs (CAPs) and identify the EVT's assigned to remaining material WPs.
 - b. Verify the EVT's are consistent with the type of material planned.
 - c. Verify the EVT's are consistent with the way the material is planned.

- d. Verify that material has not been planned earlier than point of receipt.
- e. Document all discrepancies as compliance concerns

Interview Questions

None

10.A.12 Is subcontract effort identified (as applicable) and time-phased consistent with subcontractor baseline plans?

Discussion

The prime contractor is responsible for ensuring subcontract work scope and associated time-phased budgets are consistent with the subcontractor baseline plan and that subcontractor and prime contractor baseline plans are consistent, integrated and traceable.

Impact of Noncompliance

Inconsistencies between the subcontractors' and prime's plans introduce erroneous conflicts regarding the execution of the effort and increase the risk of not accomplishing the effort on schedule and within the budget.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the RAM and the contractor's list of subcontractors to identify those subcontractors on the Project.
 - a. Obtain the subcontractors' time phased plan and compare it to the contractor's plan in the EVM Cost Tool and CAPs to verify it is time-phased consistent with the Prime's.
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

10.A.13 Are all WPs assigned scope, schedule, and budget?

Discussion

WPs and PPs must have an assigned scope of work along with a time phased budget to perform that work. In short, work and PPs are essentially "mini projects", with integration of work scope, schedule, and budget. That means the authorized work must

have a realistic approved budget spread over a realistic schedule. This includes start and stop dates with relationships in the IMS. There should be no instances of work scope without approved budget or schedule.

Impact of Noncompliance

There is no information to use for planning, executing or measuring the performance of the work effort as there is no scope, schedule or budget assigned to the WPs.

Verification Steps

Data Analysis (Automatable)

1. Verify each in-process WPs have an assigned budget value.
 - a. $X = \text{value of WP ACWP}_{\text{cum}}$ where BAC is ≤ 0
Pass: $X = 0$
Fail: $X > 0$

2. Review the remaining WPs in the EVM Cost Tool and verify the number of WPs without baselined start and completion dates.
 - a. $X = \#$ of incomplete WP without baselined start and completion dates in the EVM Cost Tool
Pass: $X = 0$
Fail: $X > 0$

Artifact Traces between Documents

1. Verify scope, schedule, and budget exists for remaining WPs.
 - a. Using the WBS Dictionary, WAD, and EVM Cost Tool/CAPs, confirm that all remaining WPs are assigned a scope of work.
 - b. Once verified, confirm all WPs are included in the baseline IMS. Note: level of effort activities may be excluded, per the contractor's procedures.
 - c. Confirm that all WPs have approved budget.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

10.B Subsection - WP Status

An accurate measurement of progress or status provides management with the information necessary to make decisions regarding issues that impact cost, schedule, and technical achievement of project objectives. Measurement of performance must be aligned with the EVT's selected during the planning process to ensure consistency between how the effort was planned to be executed and how progress is measured and reported. The appropriate EVT provides an objective measurement of progress.

The guideline is further defined by QE LOI shown below.

10.B.1	Is the percent complete earned value technique (EVT) supported by quantifiable backup documentation (QBD) if longer than 20 working days?
10.B.2	Is any work classified as apportioned effort EVT properly classified, directly proportional to other discrete task(s)?
10.B.3	Is the apportioned effort base and its proportional relationship documented and maintained by the Control Account Manager?

QE LOIs Repeated With Discussions

10.B.1 Is the percent complete earned value technique (EVT) supported by quantifiable backup documentation (QBD) if longer than 20 working days?

Discussion

The earned value or BCWP claimed during the statusing process must be objectively measured. Interim measurements of progress should be documented with QBDs for WPs greater than 44 working days. Generally, QBDs are developed to support an easy compilation of tracking status by smaller increments to the reported percent complete value. An example follows:

QBD for WP A.1.a.1 Develop Water Drainage Drawings					
		Hours	% of Total	Cum % Accomplishment	Completed
QBD 1	Review Specs	20	14%	100%	3/22/2015
QBD 2	Complete initial concept	40	29%	100%	4/28/2015
QBD 3	Complete initial drawings	60	43%	10%	
QBD 4	Complete final drawings	20	14%	0%	
	Total	140	100%	47%	

Figure 12- QBD Example

The CAM reviews the applicable QBD when statusing the WP and claims the % complete based on the values in the QBD. The CAM must consistently follow the established allocated units (hours in the example) when claiming performance. The CAM is limited to the values in the Cum% column to ensure the measurement of progress is supported by the QBD. While the example reflects a logical sequence of completing the QBDs in order (1,2,3,4), other QBDs may be completed in any order, if appropriate. Alternatively, QBDs may be represented in the IMS as activities logically planned.

Impact of Noncompliance

Inaccurate measurement of BCWP causes both CVs and SVs to be inaccurate and impacts the validity of the variance analyses and the EAC reported to DOE.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. For those WPs with % Complete EVT's, ask for the EVT QBD documentation (excel spreadsheet or in IMS) and verify the QBD supports the WP measurement of progress in the EVM Cost Tool.
 - a. Document all discrepancies as compliance concerns
2. Pull a report from the EVM Cost Tool and identify the remaining WPs with % Complete EVT's.
 - a. Verify a sample of the in-progress WPs have QBDs that justify the % Complete EVT.
 - b. $X = \#$ of % Complete EVT in-progress WPs sampled with no QBD defined
 - c. Tolerance = 0
3. Review the IMS for the WP(s) selected. Does the IMS progress support the BCWP status indicated on the QBD? Document all discrepancies as compliance concerns

(Note that the field for Schedule % complete in the IMS is calendar based and is based on elapsed time, not earned value measurement. This field should not be used for comparison to BCWP).

Interview Questions

None

10.B.2 Is any work classified as apportioned effort EVT properly classified, directly proportional to other discrete task(s)?

Discussion

Apportioned effort is effort that by itself is not readily measured or divisible into discrete WPs. Apportioned work must have an identifiable and proportional relationship to a separate but related discrete task. A typical example of apportioned effort is quality inspection, which is directly related to the final assembly of an item. The inspectors cannot perform their work until the item is assembled. This is shown in the following example.

Month	1	2	3	4	5
Base WP, Final Assembly					
BCWS \$	\$ 1,000	\$ 2,000	\$ 3,500	\$ 4,000	\$ 1,000
Apportioned WP, Final Inspection					
Planned as 7% against base	\$ 70	\$ 140	\$ 245	\$ 280	\$ 70

Figure 13 - Apportioned Effort Example

BCWS is planned and BCWP earned as a direct percentage of the related (a.k.a. base) discrete WP(s) BCWS and BCWP. Therefore the durations and schedules for both the discrete and apportioned WPs must be the same. The apportioned relationship must be based upon history and must be documented by the CAM. ACWP is recorded directly and not apportioned from the base WP.

Impact of Noncompliance

Inaccurate EVMS reporting impacts the CAMs ability to effectively manage the control account.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the Contractor’s EVM SDEVMS SD and procedures to determine how apportioned effort is classified and documented.
 - a. For those WPs that have apportioned EVTs review the WAD scope statement to verify the WP is accurately classified
 - b. Verify the base statement of work and EVT to ensure a discrete performance

- c. Ask for documentation as to the other discrete work for which it is based and verify it is planned directly proportional each month (can be offset as long as still directly proportional month by month)
- d. Document all discrepancies as compliance concerns

Interview Questions

None

10.B.3 Is the apportioned effort base and its proportional relationship documented and maintained by the Control Account Manager?

Discussion

If the contractor chooses to use this technique, the contractor's EVM SD must address the requirements for the use of this measurement technique and the need for the Control Account Manager (CAM) to document the factor used to establish the relationship; i.e., a direct, proportional relationship between the base effort and the apportioned effort. It must also point out that the progress identified in the base account (percent complete) provides the progress percentage for the apportioned effort.

Since this relationship was used to establish the budget for the apportioned WP, the percentage used as the basis for the relationship must be considered as part of the baseline and remain unchanged unless formally changed through the baseline change process.

Impact of Noncompliance

Inappropriate use of the apportioned effort technique leads to misleading variances.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the proportionality of apportioned effort to the base. This verification is typically done during the CAM interview.
 - a. Threshold: The cumulative % BCWS of the base is within 10% of the cumulative BCWS of the apportioned task for each period.

Interview Questions

1. CAM: If the apportioned effort is used for an EVT, where is the base effort and

relationship to the apportioned effort documented? Please show me.

10.C Subsection - Planning Packages

When authorized control account work scope cannot be detail planned in the near-term work packages, a planning package (PP) may be used for holding the scope, schedule, and budget. The planning package is time-phased with the known schedule requirements and is detail planned into WP(s) at the earliest practicable point prior to any work being performed on the scope contained in the planning package. The planning package budget for this effort must be identified to the work for which it is intended, time-phased, periodically reviewed for validity, and not used to perform other scopes of work. At a minimum, detail planning of PPs must occur prior to the planned start date enters the freeze period. (See Guideline 29 for more information on rolling wave process and freeze period.)

The guideline is further defined by QE LOI shown below.

10.C.1	Do planning packages have scope, schedule, and budget defined?
10.C.2	Do planning packages reflect the scope, schedule and budget expected for performance?
10.C.3	Are planning packages detail planned into work packages beyond the freeze period? (See Guideline 29 for the definition of the freeze period)

QE LOIs Repeated With Discussions

10.C.1 Do planning packages have scope, schedule, and budget defined?

Discussion

PPs represent the portion of a control account that has not yet been detail planned. They must have a specific scope, schedule and associated budget but do not have established methods of earning performance.

Impact of Noncompliance

Project work scope would not be accomplished in a well-planned manner, placing the project at risk for not meeting goals and deliverables.

Verification Steps

Data Analysis (Automatable)

1. X = value of PPs where BAC is ≤ 0
Pass: X = 0
Fail: X > 0

2. X = # of PPs with duration ≤ 0
Pass: X = 0
Fail: X > 0
3. X = # of PPs without baseline start or baseline finish in the IMS and EVM Cost Tool
Pass: X = 0
Fail X > 0

Artifact Traces between Documents

1. Pull a report from the EVM Cost Tool and select a sample of remaining significant CAs that have PPs.
 - a. Trace the scope, schedule and budget resources for the PPs as follows:
 1. Review the WBS Dictionary and WADs to verify PP scope
 2. Review and compare WADs, IMS detailed schedules, EVM Cost Tool data and CAPs to verify PP schedule
 3. Review and compare WADs, IMS detailed schedules, EVM Cost Tool data and CAPs to verify PP time phased budgeted resources
 4. Document all discrepancies as compliance concerns

Interview Questions

None

10.C.2 Do planning packages reflect the scope, schedule and budget expected for performance?

Discussion

PPs, like WPs, must have work scope, schedule, and authorized budget. The key differences between planning and WPs lie in the level of detail and assignment of EVT technique. PPs do not need to be planned in detail like WPs, e.g., they do not need to have lower level activities identified in the IMS. They are also not restricted to the performance level and 44 working days duration. Budget planning for PPs may also be a less detailed level; however the budget must be spread over the expected duration. This means PPs must be planned in the proper sequence and time periods in which the work is expected to be executed. Additionally, PPs do not have assigned EVTs.

When planning the entire control account budget, care must be taken to ensure that the budget is assigned to each planning package commensurate with the work scope. That is, the contractor must not intentionally front load the WP budgets and shortchange the future PPs. The budget is typically factored to spread the remaining budget based on ETC values. Factoring involves revising the remaining budget distribution to be proportional to ETCs so the budget is not front loaded or excess in the future.

Factoring Example

	1	2	3	4	5	6 Total	
Original Budget	10	10	10	10	10	10	60
BCWP	10	10					20
ACWP	20	20					40
ETC			20	30	40	40	130
							170 EAC
Factor						0.307692	
Revised Budget without the OTB	10	10	6.2	9.2	12.3	12.3	60

In this example time now is month 2 and BCWP and actuals are through this date. An ETC is developed with a different profile that totals \$130. This added to the \$40 ACWP totals an EAC of \$170. The current BCWS is not realistic flat loaded as compared with the ETC. If an OTB/OTS is not approved then factoring may be the best alternative. The factor is the Remaining Budget/ETC or $\$40/\$130 = .307692$. This ratio is multiplied by the ETC to produce a revised budget that is proportional to the ETC resource profile. The BAC of \$60 is unchanged, however the time phasing of the remainder is proportional so the overrun will continue, all other factors equal, in the same percentage each month.

Figure 14 - Factoring Example without Freeze Period

The budget for PPs must be identified specifically to the work for which it is intended, time-phased, periodically reviewed for validity, and not used to perform other scopes of work. As near-term work is more detailed than that of work scope contained in PPs, there is a periodic detail planning process in place to convert Summary Level Planning Package (SLPP) into CAs and control account PPs into WPs (or lower level activities). In order to solidify the PMB for accurate performance measurement, it is necessary to establish a freeze period. At a minimum, detail planning of PPs must occur prior to the commencement of that work within the freeze period. (See Guideline 29)

Impact of Noncompliance

Failure to plan adequate budget and/or properly time phase the planning package invalidates the PMB, resulting in poor performance measurement and, possibly, project execution.

Verification Steps

Data Analysis (Automatable)

1. X = # of PPs where # of assigned OBS is < 1
 Pass: X = 0
 Fail: X > 0

Artifact Traces between Documents

1. Pull a report from the EVM Cost Tool and select a sample of remaining significant CAs that have discrete PPs.
 - a. Trace the scope, schedule and budget resources for the PPs as follows:
 - b. Review the WBS Dictionary and WADs to verify PP scope (or other scope document provided by the contractor if the dictionary is not down to that level)
 - c. Review and compare WADs, IMS detailed schedules, EVM Cost Tool data and CAPs to verify PP schedule
 - d. Review and compare WADs, IMS detailed schedules, EVM Cost Tool data and CAPs to verify PP time phased budgeted resources are consistent with the scope and the baseline start and finish dates in the IMS.
 - e. Document all discrepancies as compliance concerns

Interview Questions

1. CAM – How did you plan the duration and value of the planning package(s)?

10.C.3 Are planning packages detail planned into work packages beyond the freeze period? (See Guideline 29 for the definition of the freeze period)

Discussion

When authorized control account work scope cannot be planned in the near-term, a planning package is used for holding the scope, schedule, and budget until the work is detail planned into WPs. PPs are time-phased with known schedule requirements and detail planned into WP(s) at the earliest practicable point prior to the baseline start entering the freeze period. (See guideline 29). It should be noted that the process of using PPs for effort that is in the future and determination of when to convert PPs into WPs with sound, accurate detail planning is left to the contractor. This flexibility helps minimize premature planning that is not well aligned with project objectives.

Impact of Noncompliance

PPs within the freeze period invalidates the detail planning.

Verification Steps

Data Analysis (Automatable)

1. $X = \#$ of PPs that have baseline start dates in the freeze period or earlier
Pass: $X = 0$

Fail: $X > 0$

2. $X = \#$ of PPs with Cum ACWP

Pass: $X = 0$

Fail: $X > 0$

3. $X = \#$ of PPs with Cum BCWP

Pass: $X = 0$

Fail: $X > 0$

Artifact Traces between Documents

None

Interview Questions

None

Guideline 10 – Work Package and Planning Package Typical Artifacts Common to the QE LOIs

- EVM SD
- Contract Work Breakdown Structure (CWBS) Dictionary
- RAM
- WADs
- IMS
- EVM Cost Tool Management Reports
- CAPs
- BOE
- List of Subcontractors
- IPMR/CPR – Prime and Subcontractor

Guideline 11 - Sum WP/PP Budgets to Control Account

Provide that the sum of all WP budgets plus planning package budgets within a control account equals the control account budget.

The guideline is further defined by QE LOI shown below.

11.A.1	Do the sum of all work package budgets plus planning package budgets within control accounts equal the budgets authorized for those control accounts?
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QE LOIs Repeated With Discussions

11.A.1 Do the sum of all work package budgets plus planning package budgets within control accounts equal the budgets authorized for those control accounts?

Discussion

All CAs contain the budget that represents the work scope assigned to the responsible organization for that specific effort. This includes WPs and PPs. The value of the budget assigned to individual WPs and PPs within the control account must sum to the total budget authorized for that control account.

Impact of Noncompliance

Lack of integration of WP to CA invalidates the usefulness of EVM reporting.

Verification Steps

Data Analysis (Automatable)

1. $X = \text{Sum of } |\Delta \$| \text{ of CA's where } ((\text{sum of } \$ \text{ BAC from all WPs and PPs in a CA}) - (\text{CA } \$ \text{ BAC})) \text{ does not} = 0$
Pass: $X = 0$
Fail: $X > 0$
2. $X = \text{Sum of } |\Delta \$| \text{ of CA's where } ((\text{sum of } \text{BCWS}_{\text{cur}} \text{ from all WPs and PPs in a CA}) - (\text{CA } \text{BCWS}_{\text{cur}})) \text{ does not} = 0$
Pass: $X/Y = 0$
Fail: $X/Y > 0$

Artifact Traces between Documents

1. Compare the CA data in the EVM Cost Tool and CAPs above to the WADs for the CAs to verify the authorized budgets are consistent in the EVM Cost Tool

Interview Questions

None

Guideline 11 – Control Account Budget Typical Artifacts Common to the QE LOIs

- RAM
- WADs
- EVM Cost Tool Management Reports
- CAPs

Guideline 12 - Level of Effort (LOE) Planning and Control

Identify and control LOE activity by time-phased budgets established for this purpose. Only that effort which is not measurable or for which measurement is impracticable may be classified as LOE.

The guideline is further defined by QE LOI defined below.

12.A.1	Is the LOE EV technique only used for work that does not produce a definable end product?
12.A.2	Is LOE time phased by accounting month and by EOC?
12.A.3	Does LOE have budgets and work scope supported by sound rationale and time-phased to properly reflect when the work will be accomplished?
12.A.4	Is LOE planned in separate WPs or control accounts from discrete effort?
12.A.5	Is the co-mingling of LOE and discrete effort within a control account minimized to ensure visibility of the performance measurement of the discrete effort?

QE LOIs Repeated With Discussions

12.A.1 Is the LOE EV technique only used for work that does not produce a definable end product?

Discussion

LOE is work defined as having no practicable, measurable output or product that can be discretely planned and objectively measured. LOE scope is typically administrative or supportive in nature and may include work in areas such as project management, contract administration, financial management, security, field support, help desk support, clerical support, etc. When determining whether LOE as an EVT (EVT) is appropriate, an understanding of the nature of the work is imperative rather than setting a threshold for the amount of LOE allowed.

A primary deciding factor on whether LOE can be used is whether it can be delayed without impacting discrete work. A true LOE can slip years without impacting other discrete work. For example project controls may produce monthly reports and be responsible for uploads to PARSII each month. Although these functions are DOE requirements, the slippage would not affect discrete work and so it could be tracked as level of effort. Staffing of level of effort is also an indication. Management level activities are typically planned by headcount (hours will peak in longer accounting months) and also typically LOE.

LOE is earned through the passing of time and therefore can have no schedule variance. LOE work should not be mixed with discrete WPs or CAs, as it will mask the true performance of the discrete work. If it is mixed, there must be a means of separately measuring the performance of the discrete work. As a general rule, the amount of LOE

scope within a discrete WP or CA should not exceed 10 percent to keep from masking the performance of the discrete work. LOE WPs/activities must not contain schedule logic ties to discrete work activities, as that would potentially distort the calculation of the critical path.

Impact of Noncompliance

Inappropriately coding measurable work using the LOE EVT limits the ability to measure the performance of that work and tends to mask the performance of other measurable work in the WP, CA and the project.

Verification Steps

Data Analysis (Automatable)

1. $X = \#$ of in-progress and completed LOE WP where $(BCWP\ Cum - BCWS\ Cum)$ does not = 0
Pass: $X = 0$
Fail: $X > 0$

Artifact Traces between Documents

1. Pull a report from the EVM Cost Tool that shows WPs coded with and EVT of LOE.
 - a. For those WPs coded with and EVT of LOE review the WBS Dictionary with the WAD scope for the WPs to verify the effort does not produce a measureable end product.
 - b. Document all discrepancies as compliance concerns
2. Evaluate if measurable scope is included in incomplete Level of Effort (LOE) WPs (WP) in the IMS (if applicable).
 - a. Check the IMS Supplemental Guidance to see if LOE is included in the IMS.
 - b. If so, refer to the IMS Data Dictionary to see how LOE is coded in the IMS.
 - c. Based on the IMS Data Dictionary, filter for LOE effort with no actual finish date.
 - d. Review LOE activities to assess whether they contain measurable scope.
 - e. For LOE task appearing to have measurable scope, follow up on the CAM interview to verify whether the activities should be discrete.
 - f. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: For WPxx, can this effort slip for a significant amount of time without a technical impact?

12.A.2 Is LOE time phased by accounting month and by EOC?

Discussion

All WPs, including those classified as LOE, must be detail planned, budgeted and time-phased in the EVMS Cost Tool to ensure consistent statusing and reporting of progress. Typically, the contractor's accounting system establishes the accounting calendar which is used to plan the budget for the all WPs, including LOE WPs. Work packages, including those classified as LOE, are required to be resource loaded by EOC to enable analysis of the nature and root causes of variances throughout project execution.

Impact of Noncompliance

Failure to time phase LOE resources by EOC can result in false cost variances during execution and in misleading performance reporting.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify LOE is time phased by accounting month and by EOC. $X = \#$ of incomplete LOE WPs with IMS baseline finish dates outside of the accounting month of completion in the EVM Cost Tool
 - a. Tolerance = 0
2. $X = \#$ of incomplete LOE WPs not budgeted by EOC.
Pass: $X = 0$
Fail: $X > 0$
Verify with the electronic CAP. Filter for LOE activities and examine any line that does not have an EOC.

Interview Questions

None

12.A.3 Does LOE have budgets and work scope supported by sound rationale and time-phased to properly reflect when the work will be accomplished?

Discussion

All WPs, including LOE have a defined scope, schedule and budget supporting project goals and deliverables. LOE WPs must be supported by sound rationale generally found in the Basis of Estimate (BOE). This rationale is not the same as discrete WP, and instead typically justifies positions and levels of staffing. Baseline start and finish dates for WPs planned as LOE must be proactively managed to ensure variances do not result from failure to maintain the plan.

Impact of Noncompliance

LOE without sound rationale invalidates the PMB.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Pull a report from the EVM Cost Tool filtered for LOE WPs
 - a. For incomplete and future LOE WPs, review the WBS Dictionary with the WADs to determine the authorized scope of work and budget for each LOE WP.
 - b. For the same LOE WPs, review the CAPs to verify the budget is time phased appropriately to support the scope of work.
 - c. For those same LOE WPs, compare the authorized scope, schedule and budget to the CA BOE to verify the WP planning is rational and supports the effort.
 - d. Document inconsistencies as discrepancies.

Interview Questions

None

12.A.4 Is LOE planned in separate WPs or control accounts from discrete effort?

Discussion

LOE and discrete types of work are very different in that discrete work has an end product/event and can be measured while LOE is general or supportive in nature and has no measurable output or product or activities that can be measured. WPs are categorized as LOE or discrete.

The use of the LOE EVT must be limited to those activities/WPs that are not measurable. LOE and discrete activities should not be mixed within the same WP. Also,

the value of LOE work packages within a CA should be limited so as not to distort the performance measurement of the CA. If it is mixed, the performance of the discrete work must be separately determinable (See LOI 12.A.5).

Impact of Noncompliance

The co-mingling of LOE and discrete EVT's in the same WP may mask the accuracy of the true performance of the discrete work within the WP.

Verification Steps

Data Analysis (Automatable)

1. $X = \#$ of incomplete CA with both LOE and Discrete Work Packages

Pass: $X = 0$

Fail: $X > 0$

This test is combined with the 12.A.5 test

Artifact Traces between Documents

None

Interview Questions

None

12.A.5 Is the co-mingling of LOE and discrete effort within a control account minimized to ensure visibility of the performance measurement of the discrete effort?

Discussion

Because LOE accrues BCWP equal to BCWS by the passage of time, there is no objectivity in measuring progress. The SV is always = 0, which tends to mask SV's applicability to discrete effort if the two EVT types are co-mingled within a CA. When a CA contains WPs planned with both discrete and LOE, care must be taken to minimize any potential distortion of CA performance. The focus of this QE LOI is within the CA. Generally a limit of 10% is the rule of thumb for LOE in a discrete CA and if exceeded, a separate CA for the LOE should be considered. An example illustrates the point:

LOE Mixed with Discrete Work Packages Example					
		1	2	3 Total	
WP 1	Discrete	10	10	10	30
WP 2	Discrete	20	20	20	60
WP 3	LOE	20	20	20	60
CA Total		51	52	53	150
% LOE					40%
Status	%C	SV	SV%		
WP 1	28%	(1.60)	-16%		
WP 2	28%	(3.20)	-16%		
WP 3	33%	0.00	0%		
CA Total		(4.80)	-9.41%		

The example shows a 16% slip to WP 1 and 2 and how the LOE affects the total. BCWP for work packages 1 is 28% of 30 = 8.4. The schedule variance for month 1 is 8.4-10 or (1.6). The work package 2 BCWP is 28% of 60 = 16.8. Schedule variance is 16.8-20 = (3.2). They both equate to a 16% schedule variance. The WP 3 is LOE with no schedule variance. The impact of the discrete is offset by the LOE WP and the total control account is under the 10% typical threshold for reporting. This is why LOE should not be mixed with discrete work.

Figure 15 - Impact of LOE Comingling

Impact of Noncompliance

The schedule performance (BCWP) of the CA may be masked by the co-mingled LOE and discrete effort. This could result in an inaccurate overall progress assessment for the project.

Verification Steps

Data Analysis (Automatable)

1. X = LOE BAC for incomplete CA with both LOE and Discrete Work Packages /
Y = BAC for incomplete CA with both LOE and Discrete Work Packages
Pass: X/Y <= 15%

Fail: X/Y > 15%

Artifact Traces between Documents

None

Interview Questions

None

Guideline 12 – Level of Effort (LOE) Typical Artifacts Common to the QE LOIs

- EVM SD
- CWBS Dictionary
- WADs
- IMS and Data Dictionary
- EVM Cost Tool Management Reports
- CAPs
- BOE

Guideline 13 –Establish Overhead Budgets

Establish overhead budgets for each significant organizational component of the company for expenses, which will become indirect costs. Reflect in the project budgets, at the appropriate level, the amounts in overhead pools that are planned to be allocated to the project as indirect costs.

Guideline 13 and the related QE LOIs are discussed in Section 7. This guideline along with guidelines 4, 19, and 24 are described as a whole in Section 7.0 Indirect Guidelines.

Guideline 14 - Identify MR and UB

Identify management reserves and undistributed budget

This guideline is further divided out into subsections for clarification.

- Management Reserve (MR)
- Undistributed Budget (UB)

MR: managing MR

UB: managing UB

14.A Subsection – Management Reserve

MR is budget set aside allowing project management to react to project risk and in-scope, unanticipated events that arise during the life of a project. MR is not associated with a specific scope of work until it is allocated to a CA and therefore, is not included in the PMB. The application of MR must be formally allocated through the change control process. Through this process, the MR budget is transferred to WPs within the PMB. MR is not a source of budget for additional work scope (out of scope of the contract/project) or for the elimination of performance variances. MR belonging to a major subcontractor must be incorporated into the prime contractor's EVMS with traceability to the subcontractor's reported MR. The MR budget should be commensurate with the level of risks identified by project management.

The QE LOIs for Guideline 14, Subsection A - Management Reserve

14.A.1	Does MR budget have no scope defined and is it separately identified outside of the PMB?
14.A.2	Is all budget for MR controlled by the contractor and held above the PMB, within the project-level CBB?
14.A.3	Are contingency budgets, if any, held outside the CBB?
14.A.4	Is MR belonging to major subcontractors incorporated into the prime's MR log with traceability to the subcontractor's MR?
14.A.5	Is MR correctly defined in the System Description and are allowable applications of MR listed/defined?

QE LOIs Repeated With Discussions

14.A.1 Does MR budget have no scope defined and is it separately identified outside of the PMB?

Discussion

MR is budget set aside for handling project risk and in-scope, unanticipated events. The ability to establish MR provides project management with a budget for unplanned activities within the current project scope. Because MR is budget that is not yet associated to work scope, it is not part of the PMB.

Impact of Noncompliance

Failure to segregate MR from PMB overstates PMB and adds risk to project completion.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify MR is excluded from PMB.
 - a. Using the IPMR/CPR Format 1, verify the following trace.
 $X = \text{value of MR} - (\text{CBB} - \text{PMB})$
 $X = 0$, pass
 $X > 0$, fail
2. Confirm unallocated MR has no defined scope.
 - a. Using the CBB log, conduct a manual check to ensure there is no scope associated with MR
Tolerance = 0
3. Validate the process for MR usage is established and controlled.
 - a. Conduct a check of EVM SD regarding explanations on the use and control of MR.
 - b. Examples of such restrictions are prohibiting the use of MR to cover cost overruns; “harvesting” MR from closed WPs and CAs that have under run; using MR for authorized, unpriced work; and using MR for possible new work that has not been authorized by the customer.
 - c. Document all discrepancies as compliance concerns

Interview Questions

1. Project Controls: Are there any known encumbrances to the existing MR balance (risks or liens)?

14.A.2 Is all budget for MR controlled by the contractor and held above the PMB, within the project-level CBB?

Discussion

MR is held at the project level and is managed by the project manager. The PMB plus MR = the CBB. MR enables the project management to respond to future unforeseen events within the work scope of the project/project by distributing budget to mitigate project

risks. MR is reported only at the project level per the IPMR/CPR Data Item Descriptions (DIDs). MR may never be negative.

To establish MR, the contractor's project management sets aside budget based on the project's risk management process and assessment.

Impact of Noncompliance

Project management would not have the visibility of how much MR is available for the project to handle risks and in-scope unanticipated events which would impact effective decision making regarding risk mitigation activities.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm the level of MR on the project. Verify all budget for MR is identified and held at the project level.
 - a. Using the PEP, baseline control log, EVM Cost Tool and IPMR/CPR Format 1, confirm all MR is held at the project level, not at any sub levels or divisions.
 - b. X= \$ value of MR held at other than the project level
 - c. Tolerance = 0

Interview Questions

1. Project Controls: Who has final authority over usage of MR?

14.A.3 Are contingency budgets, if any, held outside the CBB?

Discussion

DOE Contingency budgets are budgets that are available for risk associated with technical uncertainty or programmatic risks owned by the Government. Contingency budgets are controlled by the Federal staff. While contingency is included in the Total Project Cost (TPC), it is not part of the CBB.

Impact of Noncompliance

The CBB would be artificially increased creating the potential for the planning to be in excess of the contractually authorized amount.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm the DOE Contingency/risk budget is held outside the CBB
 - a. Review the project, PEP, and CBB log and verify that DOE Contingency is budget that is not placed on the project and is included in the TPC. Contingency is controlled by Federal personnel as delineated in the PEP.
 - b. Review the CBB log. Verify if there is DOE contingency or DOE ODC included, it is not in the CBB totals.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

14.A.4 Is MR belonging to major subcontractors incorporated into the prime's MR log with traceability to the subcontractor's MR?

Discussion

Subcontractors may hold their own MR if there is an EVMS flow down from the prime. If there is any MR belonging to a major subcontractor, it must be incorporated into the prime contractor's EVMS reporting to DOE with traceability to the subcontractor's reported MR in Format 5, or other applicable documentation if Format 5 is not required.

Impact of Noncompliance

Project management and the DOE would not have visibility as to how much MR, at the project level, is available for handling risks and in-scope unanticipated events. This impacts effective decision making regarding risk mitigation activities.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Obtain the subcontractor's IPMR/CPR and review the Prime's CBB log or supporting MR Log to confirm MR belonging to major subcontractors is incorporated into the prime's log with traceability to the subcontractor's MR.
 - a. Document all discrepancies as compliance concerns

Interview Questions

None

14.A.5 Is MR correctly defined in the System Description and are allowable applications of MR listed/defined?

Discussion

The contractor must include a clear definition of MR in the EVM SD. Additionally, for clarity and consistency, the SD must also describe and list allowable conditions under which MR may be approved and allocated to the PMB CAs, such as new work that is out of scope to the CA but in scope to the contract, rate changes, or risk mitigation/opportunities. It is also helpful that the SD list unallowable applications as well. This provides clear guidance to the entire project team and helps ensure compliance with the EIA-748 C.

Impact of Noncompliance

Failure to properly define and list the conditions for MR will result in misinterpretation and inconsistent use of MR, limiting the project manager's ability to manage MR.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the EVM SD to verify that it contains a clear definition of MR, as well as a description of the allowable conditions for its use.

Interview Questions

None

14.B Subsection - Undistributed Budget

UB is budget that is applicable to specific contractual effort that has not yet been distributed to CAs or SLPPs. Identification of the project's UB, facilitates project/project management's ability to account for and report on all authorized scope and budget. UB is a transitional budget that should be distributed in a timely manner as work scope is finalized and distributed to CAs or to SLPPs. UB may also contain scope subject to removal from the distributed baseline because of contractual changes. Budgets for the near-term portion of scope should be allocated commensurate with when the work is authorized.

The QE LOIs for Guideline 14, Subsection B - Undistributed Budget

14.B.1	Does UB have defined scope that is separately identified by change authorization, traceable to contractual actions and is it part of the PMB?
14.B.2	As a minimum, is at least the near-term portion of authorized unpriced work (AUW) detailed planned in control accounts with the remainder contained in UB?

QE LOIs Repeated With Discussions

14.B.1 Does UB have defined scope that is separately identified by change authorization, traceable to contractual actions and is it part of the PMB?

Discussion

UB is part of the PMB and has budget associated with contractually authorized work scope that has not yet been distributed to an organizational element at or below the WBS reporting level. The key of the QE LOI is that UB, unlike MR, always has scope. Each project change must be tracked within UB until totally allocated to the time phased PMB or MR. The format 5 of the CPR must discuss the composition of the UB balance in terms of the project authorization.

Scope and associated budgets that may reside in UB include:

- Authorized Unpriced Work (AUW),
- Newly definitized work scope,
- Work that has been de-scoped but not yet contractually removed from the project.

UB is a short-term holding account where the budget is expected to be distributed into the PMB or removed from the contract. Delays in contract direction may impact the timely distribution of UB into CAs.

Impact of Noncompliance

Unreconciled UB is equivalent to an unreconciled PMB.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify UB value in Format 1 block 8d14 is included in the PMB.
 - a. Using the IPMR/CPR Format 1 totals in Block 8 to confirm the following trace
X= value of UB - (PMB – sum of CA budgets (blocks 8d1 thru 13))
X = 0, pass
X <> 0, fail
Tolerance = 0
2. Confirm UB has defined scope.
 - a. Using the contract, project logs, the EVM Cost Tool data and the IPMR/CPR, verify UB transactions show documented scope traceability from the contract through the project logs to internal and external (DOE) data.
X= # of UB transactions without defined scope
 - b. Tolerance = 0

Interview Questions

None

14.B.2 As a minimum, is at least the near-term portion of authorized unpriced work (AUW) detailed planned in control accounts with the remainder contained in UB?

Discussion

AUW represents a contract scope change that has been directed by the government contracting officer but has not yet been fully negotiated or definitized. It includes a value, excluding fee or profit, typically associated with the authorized, unpriced change order. The word “unpriced” can be confusing. It means simply that the final cost to the government has not yet been negotiated at the final price.

Often a change is authorized where the Government and contractor agree to start implementing the change before the value of the change is negotiated. When this happens, the contractor must add the expected value of the change to UB and then distribute a portion of that value to the CA(s) responsible for implementing the change in the near term, prior to definitization. The budget initially distributed to the CA(s) may only represent the near term effort to get started and the remainder of the budget may stay in UB until the total value of the change is definitized. Any differences between the expected

value of the change the contractor initially placed in UB and the definitized value is reflected in a change to UB and documented as such.

There may be an NTE value associated with the authorization. The NTE value is not used as the total AUW amount authorized unless equal to the scope of the authorization.

Impact of Noncompliance

Without distribution from UB to the CA, near term effort cannot be planned in WPs and resources cannot begin work on it which results in a schedule slip. Without the remainder of the budget reflected in UB, reporting to project management and the DOE will be inaccurate.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the authorizing documentation for the AUW and trace it to the CBB logs. Continue the trace from the log to the CAs for the near term effort.
 - a. Review the authorizing document from contracts and the WADs to understand the scope of work that has been authorized.
 - b. Review change control documents and the CBB log to determine what AUW budget and scope has been allocated to CAs and what has been placed in UB.
 - c. Review the IMS at the detailed level to verify the near term effort has been scheduled.
 - d. Review the appropriate CAPs to verify the near term effort has been planned in the control accounts for the near term effort with the balance remaining in UB.
 - e. Review the IPMR/CPR Format 1, blocks 8d1-14 to verify the AUW data is accurately accounted for in CAs and UB and reported to DOE.
 - f. Document inconsistencies as discrepancies.

Interview Questions

None

Guideline 14 – Management Reserve (MR) and Undistributed Budget (UB) Typical Artifacts Common to the QE LOIs

- EVM SD
- WADs

- EVM Cost Tool Management Reports
- CAPs
- List of Subcontractors
- IPMR/CPR Format 1 – Prime and Subcontractor
- Project Logs – Prime and Subcontractor
- PEP
- Contract
- Project Change Documentation

Guideline 15 - Reconcile to Target Costs

Provide that the program target cost goal is reconciled with the sum of all internal program budgets and management reserves.

The guideline is further defined by QE LOI defined below.

15.A.1	Does the TPC = CBB + OTB + Fee + ODC + DOE Contingency as applicable?
15.A.2	Is there a reconciliation of the TAB to the CBB?

QE LOIs Repeated With Discussions

15. A.1 Does the TPC = CBB + OTB + Fee + ODC + DOE Contingency as applicable?

Discussion

The CBB, OTB, fee, ODC, and DOE contingency reflect the total Government cost authorized for the project. The TPC has to cover both authorization and funding. OTBs have no scope authorization but are recognized overruns of existing scope. So the actual formula that is always true is different for the budget and the funding.

$$\text{PMB} + \text{MR}_b + \text{DOE Contingency/ODC}_b + \text{Fee}_b = \text{TPC} = \text{EAC} + \text{MR}_r + \text{DOE Contingency}_r + \text{ODC EAC} + \text{Fee earned/available}$$

Note: In the above equation the left side is budget indicated by the subscript "b". The right side is remaining or EAC indicated by the subscript "r". The left side is also authorization and the right side is funding.

Note: For EVMS compliance: The contractor is only responsible for accounting for and managing the CBB and OTB, even though DOE M&O contractors are often tasked with accounting for the other three elements of TPC. This QE LOI does not apply to FAR Part 15 projects. M&O contractors who are required to track DOE Contingency, ODC and fee may maintain these budgets in the CBB log, but should keep all items separately identifiable and traceable. .

Impact of Noncompliance

Non-reconcilable TPC means the project cannot account for all budget authorized for the project.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm both the authorization and funding equations discussed in the narrative.
 - a. Using the EVM Cost Tool and the CBB or Project Logs, verify this calculation.

$X = \text{Total \$ value of DOE Contingency plus PMB} + \text{MR} + \text{OTB plus profit or fee plus ODC}$
 $Y = \text{Total \$ value of TPC}$

- b. Document all discrepancies as compliance concerns

Interview Questions

None

15.A.2 Is there a reconciliation of the TAB to the CBB?

Discussion

Reconciling the sum of all internal project budgets (CA budgets, Summary Level PPs (SLPPs), and Undistributed Budget (UB)) and MR to the contractually authorized cost establishes a valid comparison to the contract target cost. It is essential for project management to account for all budget authorized for the contractual scope of work. This is demonstrated by reconciling the negotiated contract cost (NCC) plus the estimated value of any un-negotiated unpriced-change-orders received to date to the CBB and to the Performance Measurement Baseline (PMB) plus MR to ensure there is consistency. All CA budgets, SLPPs, and UB are summed up to a total value known as the Budget at Completion (BAC) of the PMB. Having validated the sum of the internal budgets, this sum plus MR equals the value known as the CBB.

TAB is Total Allocated Budget. $TAB = CBB$ unless there is an OTB recognized. Then $CBB + OTB = TAB$.

Impact of Noncompliance

Inability to reconcile the TAB causes performance reporting to be unreliable, subject to challenge and suspect for use in making sound decisions.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm the Total Allocated Budget (TAB) reconciles to CBB + OTB (if applicable)
 - a. Using Project Logs, IPMR/CPR Format 1, and EVM Cost Tool, verify the following calculation
 1. $X = \text{CA budgets} + \text{SLPP budgets} + \text{UB} + \text{MR} = \text{Total \$ value TAB}$
 - b. Document all discrepancies as compliance concerns
2. Verify the target cost value in the CBB log reconciles to the Format 1 values.
 - a. Using Project Logs, IPMR/CPR Format 1, and EVM Cost Tool, verify the following calculation
 1. $X = \frac{\text{Total \$ value of CBB log Target Cost}}{\text{Total CBB}} = \text{Total \$ value of Format 1}$
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

Guideline 15 – Reconcile Target Costs Typical Artifacts Common to the QE LOIs

- Contract and Modifications (MODs)
- Project Logs – also known as Contract Budget Base (CBB) Logs
- EVM Cost Tool Management Reports
- CAPs
- IPMR/CPR

SECTION 4.0 ACCOUNTING (GUIDELINES 16-21)

The Accounting Considerations category focuses on ensuring that all direct and indirect costs associated with accomplishing the complete scope of work contained in the contract are properly transferred to the EVM Cost Tool at the level of detail required for performance analysis and reconcilable to contract performance reports. All financial transactions are expected to be documented, approved, and recorded properly in the financial accounting system on a consistent and timely basis in accordance with Generally Accepted Accounting Principles (GAAP) and applicable Cost Accounting Standards (CAS). As the EVM Cost Tool uses direct cost data from the contractor's accounting system to accurately report project costs and to conduct EVM performance and variance analysis, the accounting system is critical to ensuring EVM performance data is reliable and auditable. The primary objective of the six guidelines (16 – 21) that comprise this category is to ensure cost data is accurately collected for a valid comparison to budgets and performance.

The Accounting Considerations guidelines require that the direct costs recorded in a formal and accepted accounting system are reconcilable to the Actual Cost of Work Performed (ACWP) reported in the EVM Cost Tool. Direct costs are accumulated and charged to CAs consistent with planned budgets and acceptable costing techniques (Guideline 16). The guidelines also require actual costs to be accurately accumulated and summarized within the EVM Cost Tool by the project's WBS and OBS elements (Guidelines 17 and 18). All indirect costs allocable to a project must be properly recorded and correctly allocated (Guideline 19 – see Section 7.0 Indirect Guidelines).

As applicable, the accounting system must be able to identify unit costs, equivalent unit costs, or lot costs, and distinguish between recurring and non-recurring costs (Guideline 20). Identifying unit costs is typically applicable to production contracts. Acceptable points for measuring material performance are specified and material costs are required to be reported in the same accounting period that performance is claimed. In the event direct costs for work accomplished have not yet been formally recorded in the accounting system, accruals and/or estimated actuals are used for EVM performance reporting and assessment thereby ensuring that any cost variances accurately represent the cost status of the work accomplished (Guidelines 16 and 21). Records showing full accountability for all material purchased for the contract, including residual inventory must be maintained (Guideline 21).

Guideline 16 - Record Direct Costs

Record direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account.

This guideline is further broken out into subsections for clarification.

- Accounting and Reconciliation with Reporting
- Reconciliation with Source Systems
- Accounting Documentation

The reconciliation section primary deals with the project reconciliation of ACWP. It also seeks to maintain overall consistency with the disclosure statement.

The Reconciliation with Source Systems section deals with how the accounting system is integrated with purchasing, labor, and other inputs to the accounting system. The accounting system is the books of record for ACWP and is updated from other source records.

The Accounting Documentation subsection addresses the integration of open and closed charge numbers consistent with the work requirement.

The guideline is further defined by QE LOI shown below.

16.A.1	Is the actual cost of work performed (ACWP) in the EVM Cost Tool reconcilable with the actual costs in the accounting system and formally reconciled monthly?
16.A.2	Does the contractor classify its direct cost (direct labor, material, other direct costs) and credits consistent with their approved Disclosure Statement?
16.A.3	Is ACWP recorded in the same month that BCWP is claimed (for all elements of cost)?
16.A.4	Are direct costs recorded in the control account on the same basis as budgets were established at a minimum by element of cost (EOC)?
16.A.5	Are ACWP values in the EVM Cost Tool reconcilable to PARSII and the IPMR/CPR as applicable?
16.A.6	Are accounting system reconciled actuals provided in a timely manner to support analysis and reporting?
16.A.7	Are negative ACWP values (if any) infrequent, justified, approved, and significant adjustments are addressed in Format 5 of the IPMR/CPR?
16.A.8	Are estimated actual costs (accruals) reversed to avoid double counting?

16.A Subsection – Accounting Accumulation and Reconciliation with Reporting

The QE LOIs in this section are primarily the responsibility of the project and the Project Controls Organization. The primary assumptions are that the EVM reported actuals reconcile with the accounting systems and are supported, if required, by estimated actuals. The calculation of ACWP is also consistent with the disclosure statement.

QE LOIs Repeated With Discussions

16.A.1 Is the actual cost of work performed (ACWP) in the EVM Cost Tool reconcilable with the actual costs in the accounting system and formally reconciled monthly?

Discussion

Actuals from the accounting system and the ACWP reported in required EVM reports must be reconciled at the end of each accounting period and the results of the reconciliation should be documented. There are a couple of aspects that need to be considered:

- Reconciliation is required for ACWP reported as of the accounting month-end date. (Reconciliation does not mean equal. For example, estimated actuals may be needed for labor, material, or subcontractor payment lags).
- ACWP must be consistent with BCWP in terms of the reporting period.
- Reconciliation is required at the project level by EOC.
- Estimated actuals must be justified at the level applied.
- Reconciliation is both monthly and cumulative to date.

Impact of Noncompliance

Failure to reconcile actuals between the accounting and cost systems invalidates the cost variance and prevents accurate and effective performance management.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify that the accounting actuals at the WBS level 1 plus estimated actuals, if any, reconcile with ACWP in the EVM Cost Tool.
 - a. Perform a check for estimated actuals:
 1. $X = \text{Sum of absolute values of (Accounting system cumulative actual cost - EVM Cost Tool cumulative actual cost)}$
 2. If the result of this test = 0, there are no estimated actuals to consider. Otherwise, continue with the remaining steps.
 3. Note: this trace can also be accomplished via a reconciliation provided by the contractor that is verifiable.
 - b. Verify the accounting actuals plus estimated actuals equals the reported ACWP.
 1. Obtain a report at WBS level 1 from the EVM Cost Tool.
 2. Obtain an accounting report at WBS level 1 for the project.
 3. Obtain estimated actuals if any for the current month only from the EVM Cost Tool.
 4. Verify the sum of the accounting report plus estimated actual dollars equals the reported ACWP in the EVM Cost Tool.
 5. This trace is performed for 3 consecutive periods with the latest one being the month reported through.
 6. There should be less than \$1,000 variance irreconcilable each month.

Interview Questions

None

16.A.2 Does the contractor classify its direct cost (direct labor, material, other direct costs) and credits consistent with their approved Disclosure Statement?

Discussion:

EOC such as labor, material and ODC defined in the Disclosure Statement must be consistent with the accounting system tracking of EOCs for direct cost elements. Note this is the accounting system EOCs and not the EVM Cost Tool EOCs. The matching of actual allowable costs to the planned budgets ensures only the resources expended to achieve that same scope/product can be accumulated against the CA.

Impact of Noncompliance

Inconsistency of direct costs to the disclosure statement means the contractor is not compliant with contract requirements approved by DOE CFO.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify approvals and direct cost classifications between the disclosure statement and accounting system.
 - a. Obtain the latest approved disclosure statement. Verify the Disclosure Statement has been DCAA approved or independent third party verified approval within the last 3 years. Verify disclosure statement includes Accounting System approval reference.
 - b. Note all EOCs that are defined in the disclosure statement.
 - c. Obtain a report from the accounting system with all of the elements of cost.
 - d. Compare the lists. All of the disclosure statement EOCs must be in the accounting system; however the accounting system may have additional elements beyond the disclosure statement.
 - e. This trace is performed for the total disclosure statement defined EOCs.
 - f. Document all discrepancies as compliance concerns
2. Verify the accounting EOCs to the Project EOCS in the EVM Cost Tool.
 - a. Taking the accounting EOCs from test 1, compare them with the EOCs in the EVM Cost Tool. Typically there are less EOCs in the cost tool however there should be a logical map between the accounting EOCs and the EVM Cost Tool EOCs.
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

16.A.3 Is ACWP recorded in the same month that BCWP is claimed (for all elements of cost)?

Discussion

This QE LOI addresses the requirements for estimated actuals. In the event direct costs for subcontracted effort and/or material have not yet been formally recorded in the accounting system, estimated costs (estimated actuals) will be used for EVM performance reporting and assessment in the EVMS. This is to address timing differences between the accounting system and performance reports. Once direct costs have been recorded, they will replace the estimated costs (estimated actuals) recorded in the EVMS. This process may be used to project direct costs being removed from the EVMS, such as cost transfers, where the accounting process lags behind the identification of the need.

BCWP is the budgeted cost for what was accomplished. ACWP is what was spent to accomplish the work. BCWP-ACWP is the cost variance. For the validity of the cost variance both BCWP and ACWP must be reported in the same accounting period. However, some common reasons why they may be recorded in the accounting system in different months follow:

- Labor can be distorted because of significant errors that may be in process of correction. The primary sources for correction of labor errors are cost transfers or an individual justification.
- High Dollar Value (HDV) Material (see Guideline 21) typically has payment terms that may not coincide with calendar month-ends. By definition, HDV material is significant and tracked discretely. HDV material requires assessment of estimated actuals monthly if actuals have not been accrued. The source for the estimated actuals is typically the receipt record/PO cost.
- Subcontractors typically are required to status activities consistent with the prime's month-end date. Actuals may be delayed because of lagging invoices/payments. The source for estimated actuals is typically the subcontractor ACWP or invoice.

In all cases the ACWP must be recorded in the same month as the BCWP is recorded. There should not be months with significant BCWP without ACWP or vice versa. As general rule of thumb, "significant" is when BCWP is greater than \$2K.

The term accrual may be used instead of estimated actuals. Accruals are typically done directly in the accounting system and based on a PO, journal transfer or other verifiable record. If they are done in the accounting system, this LOI may be met since the reconciliation is between the accounting system and the EVM Cost Tool. All estimated costs (estimated actuals) used for performance reporting will be reconcilable between the Accounting General Ledger and the EVM Cost Tool.

Impact of Noncompliance

Failure to collect and record actual costs (ACWP) in the same period the work is accomplished (BCWP) negates the validity of the cost variance and prevents accurate and effective performance management.

Verification Steps

Data Analysis (Automatable)

1. $X = ACWP_{cum}$ where $ACWP_{cum} > 0$ and $BCWP_{cum} = 0$ (Exclude Material)
 $Y = ACWP_{cum}$ (Exclude Material)
 Pass: $X/Y = 0$
 Fail: $X/Y > 0$
2. $X = BCWP_{cum}$ where $BCWP_{cum} > 0$ and $ACWP_{cum} = 0$ (Exclude Material)
 $Y = BCWP_{cum}$ (Exclude Material)
 Pass: $X/Y = 0$
 Fail: $X/Y > 0$

3. $X = BCWP_{cur}$ where $BCWP_{cur} > 0$ and $ACWP_{cur} = 0$ (Exclude Material)
 $Y = BCWP_{cur}$ (Exclude Material)
 Pass: $X/Y = 0$
 Fail: $X/Y > 0$
4. $X = BCWP_{cur}$ where $BCWP_{cur} > 0$ and $ACWP_{cur} = 0$ (Exclude Material)
 $Y = BCWP_{cur}$ (Exclude Material)
 Pass: $X/Y = 0$
 Fail: $X/Y > 0$
5. $X = ACWP_{cur}$ for non-material CA/WP (only LOE) with $ACWP_{cur}$ with $BCWP_{cum} = BAC$ and $BCWP_{cur} = 0$
 $Y = ACWP_{cur}$ (Exclude Material)
 Pass: $X/Y = 0$
 Fail: $X/Y > 0$

Artifact Traces between Documents

None

Interview Questions

None

16.A.4 Are direct costs recorded in the control account on the same basis as budgets were established at a minimum by element of cost (EOC)?

Discussion

The intent of this QE LOI is to determine if actuals are recorded consistent with corresponding budget and performance. This means literally that the effort should be charged to where it is budgeted. It does not require that the EOCs in the accounting system match the EOCs in the EVM Cost Tool. However, in no case must the accounting EOCs be changed when input into the EVM Cost Tool.

EOCs will typically vary over time. There is no expectation that the budget be changed if an EOC is not charged or charged differently. The CAM should understand the charges by EOC and be able to explain the differences in variance analysis. The CAM has the option to change the future plan beyond the freeze period if the variances by EOC are significantly distorting the performance. EOCs are very relevant to how ETCs and EACs are calculated.

Impact of Noncompliance

Failure to accrue cost by EOC in the same WP/activity as budget would invalidate variance analysis and inhibit the EAC generation.

Verification Steps

Data Analysis (Automatable)

1. Confirm Actual Costs are identified in the EVM Cost Tool by Element of Cost.
 - a. $X = \$$ values of the CAWP where actuals have been incurred without an EOC identifier
Pass: $X = 0$
Fail: $X > 0$
Tolerance = 0

Artifact Traces between Documents

1. Verify consistency of the EOCs approved in the disclosure statement and accounting system. Also, see QE LOI 16.A.2.
 - a. Obtain the latest disclosure statement and verify the approval. Note all EOC that are defined in the disclosure statement.
 - b. Obtain a report from the accounting system with all of the EOCs.
 - c. Compare the lists. All of the disclosure statement EOCs must be in the accounting system; however the accounting system may have additional elements beyond the disclosure statement.
 - d. This trace is performed for the total disclosure statement defined EOCs.
 - e. Document all discrepancies as compliance concerns
2. Verify the consistency of EOCs used in the accounting system and the EVM Cost Tool
 - a. Obtain from the contractor a mapping of the EOCs from the accounting system to the EVM Cost Tool (consistent with the Disclosure statement). This would include the unique charge number coding to ensure all costs are collected and recorded at least at the CA level.
 - b. Obtain a report from the EVM Cost Tool with all of the EOCs.
 - c. Verify that the EOCs used in the EVM Cost Tool are consistent with the accounting system list obtained in artifact trace 1. All actual costs must be recorded in the EVM Cost Tool in the same EOCs where the budget and performance were recorded.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

16.A.5 Are ACWP values in the EVM Cost Tool reconcilable to PARSII and the IPMR/CPR as applicable?

Discussion

The EVM Cost Tool is reconciled with the accounting system in QE LOI 16.A.1. The EVM Cost Tool has estimated actuals, if any, added and reconciled. Therefore, the values in the Cost Tool must be used as the basis for external reporting to the DOE customer in PARS II and the IPMR/CPR. All three sources must contain the same ACWP values for the current month and cumulative to date.

Impact of Noncompliance

Irreconcilable performance data adversely impacts the credibility of performance being reported to the customer.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Compare current and cumulative ACWP in the EVM Cost Tool, to PARS II and to the IPMR/CPR Format 1 for the last 3 consecutive months.
 - a. Document all discrepancies as compliance concerns

Interview Questions

None

16.A.6 Are accounting system reconciled actuals provided in a timely manner to support analysis and reporting?

Discussion

This QE LOI addresses the timing of accounting actuals being available for the project to use. The date of reports containing accounting actual cost data is typically 1-5 working days after the accounting month-end. Significant delays these targets may impact the projects ability to reconcile, perform variance analysis, update EACs and report to the DOE in a timely manner.

Impact of Noncompliance

Delays in providing actuals inhibit the project's ability to use earned value performance data as a project management tool.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Obtain contractor guidance that states when accounting actual cost data is made are available to support analysis and reporting.
 - a. Obtain a report from the EVM Cost Tool that shows when actual costs from the accounting system were loaded into the EVM Cost Tool. The dates should be consistent with contractor guidance – i.e. within x working days after accounting month-end closing.
 - b. Document all discrepancies as compliance concerns

Interview Questions

1. Business Management: When are accounting system actuals loaded into the EVM Cost Tool?
2. CAMs: Are the accounting system actuals loaded consistently in time to allow for quality analysis and reporting?

16.A.7 Are negative ACWP values (if any) infrequent, justified, approved, and significant adjustments are addressed in Format 5 of the IPMR/CPR?

Discussion

The intent of the QE LOI is that negative ACWP in the prime system should be unusual, consistent with the disclosure statement, and discussed with DOE. Negative adjustments in this context are to prior period data. Routine approved cost transfers in the current month are not a concern in this QE LOI unless frequent and excessive. This is assessed at all WBS levels.

Impact of Noncompliance

Excess negative actual cost adjustments indicate a lack of process controls and EVMS integrity.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify negative ACWP is unusual and, if any, are justified and reported in the IPMR/CPR Format 5 narrative if significant. Perform the following trace for the previous 6 months reporting.
 - a. Obtain a report from the EVM Cost Tool and review ACWP for any significant current period and/or cumulative negative ACWP adjustments.
 - b. Compare the report with IPMR/CPR Format 1 and 5 to determine the number of negative ACWP adjustments and verify whether they are unusual or not and if they are being reported in the current period and justified in Format 5 to the DOE customer if significant.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

16.A.8 Are estimated actual costs (accruals) reversed to avoid double counting?

Discussion

When direct costs for labor, subcontracted effort and/or material have not yet been formally recorded in the accounting system, estimated costs (estimated actuals) are used for EVM performance reporting and assessment in the EVMS. This is to address timing differences between the accounting system and performance reports. Once actual direct costs have been recorded in the accounting system, the intent of this QE LOI is to ensure estimated costs (estimated actuals) will be reversed in the EVMS to avoid double counting. Material direct cost accumulation is further addressed in Guideline 21. All estimated costs (estimated actuals) used for performance reporting must be reconcilable between the General Ledger and the EVMS.

An example will help illustrate the concept. Since BCWP and ACWP are cumulative, the timing difference may no longer exist in the following month. So the need for estimated actuals must be reevaluated in the following month. Estimated actuals are typically booked in the EVM Cost Tool and not in the accounting system. Therefore the recommended process in the EVM Cost Tool is to record the estimated actual cost in the current month, and record a negative offset in the following month. The next step in the process is to reevaluate the requirement for estimated actuals the following month and reapply those necessary and continue with the same process each month until the difference is no longer required. Once the accounting system records the actual cost, the value of the estimated actual is reduced to zero. This process ensures that ACWP for the current and cumulative periods is reported correctly and not double booked.

Month	Period 1	Period 2	Period 3	Total
1 Estimate	+\$10,000	(\$10,000)	0	0
2 Estimate		\$10,000	(\$10,000)	0

Figure 16 - Estimated Actuals Example

In the first month of the example, BCWP was \$12,000, but no actual costs were reported from the accounting system. Because this would result in a significant false positive cost variance, an evaluation was performed. A cost entry of \$10,000 for the work completed was not accrued in the accounting system, so an estimated actual of \$10,000 was placed in period 1 and offset with a negative in period 2. This means the cumulative cost in month 1 is \$10,000 and the cumulative for period 2 is \$0 as reported in month 1. Since it is still period 1, it is anticipated the cost entry will accrue in the next accounting month.

In month 2, the cumulative BCWP is still \$12,000, and ACWP is \$0. So estimated actual 2 is accrued in months 2 and offset applied in month 3. This process is repeated until the actual cost entry of \$10,000 is reported in the accounting system.

Impact of Noncompliance

Failure to reverse estimated actuals when corresponding actual costs are recorded results in erroneous cost reporting, false variances, and incorrect EACs.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify estimated actuals are reversed once direct costs are posted to the EVMS.
 - a. Per the SD or process documentation, review the procedure for recording, coding, identifying corresponding direct costs, and reversing estimated actuals. Once the process is confirmed, perform the following trace for the previous 6 months reporting:
 1. Obtain a report from the EVM Cost Tool and locate estimated actuals in a previous period.
 2. In the subsequent periods, check to make sure estimated actuals are reversed in the EVM Cost Tool once direct costs are recorded in the accounting system.
 3. Document all discrepancies as compliance concerns

Interview Questions

None

16.B Subsection – Accounting Reconciliation With Source Systems

The accounting system is the book of record for actual cost collection. It typically produces or is integrated with the pay system and has employee salary information. There are various source records that are inputs such as time cards, material purchase orders, payments that are inputs or cost source put into the accounting system. For EVM Cost Tool actuals to be credible these source records must be valid, approved, reconciled, and auditable. These QE LOIs discuss this in detail.

The guideline is further defined by QE LOI shown below.

16.B.1	For material procurements, does the system provide commitment, receipts and, if applicable, usage?
16.B.2	Does the information in the labor tracking records reconcile with the accounting records?
16.B.3	Does the contractor accrue actual costs for the subcontractor in a manner that reflects the actual work performance?
16.B.4	Are accounts payable records reconcilable or used as a source for estimated actuals?
16.B.5	Are cost corrections processed in a timely, consistent manner and are they authorized, and reconcilable?
16.B.6	Are anomalies in actual cost (incorrect charges, transfers, etc.) that are identified by the CAM, corrected in a timely manner?

QE LOIs Repeated With Discussions

16.B.1 For material procurements, does the system provide commitment, receipts and, if applicable, usage?

Discussion

The purchasing system typically has separate approvals. There are a number of basic documents that impact the EVM process.

- Purchase Request (PR) – an engineering document that specifies the technical requirement. If the PR is significantly different than the Bill of Material (BOM) costs, then the CAM should identify an EAC impact for the anticipated value in the EVM Cost Tool.
- Purchase Order (PO) – this acquisition document to be sent to the source, is generated by the purchasing office and must be generated by Purchasing and needs to be compliant with all federal laws regarding sources. At this point, an

evaluation should be made to determine the commitment amount that should be accrued in the accounting system with respect to the terms and conditions of any multi-year contracts and their impact on the execution year. This analysis must be done to identify the appropriate value to be represented in the EVM Cost Tool. The EAC should also be updated for the difference, if any, between the BOM or estimated price and the final acquisition price.

- Purchase Receipt – This includes inspection and is the receipt documenting acceptance. Generally this is the point in which BCWP is claimed for HDV material. At this point, the obligation to pay should be accrued in the accounting system or as an estimated actual based on the quantity received multiplied by the PO price.
- Vendor Invoice – This document is needed before accounts payable can write a check and actuals hit the accounting book of record. Accounts payable usually requires the PO, the PR and the vendor invoice to verify material, quantity and dollar amount in order to make an accurate payment to the vendor.
- Inventory Usage Documentation – The accounting system must account for the cost of material used to include scrap, rework, test rejections and unanticipated test quantities. Also see guideline 20 for usage requirement.

At all times, these source records must be traceable and reconcile with the accounting commitment, obligations, actual values, and the EVM Cost Tool earned value (BCWP) assessments, and ACWP values (with estimated actuals if required).

Impact of Noncompliance

Failure to reconcile the purchasing system, the accounting system and the EVM Cost Tool could understate the EAC reported to DOE and impact contractor funding requirements.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor's EVM SD and procedures and the Accounting Manual and procedures to understand the contractor's processes for ensuring the purchasing system and the accounting system data reconcile.
 - a. Obtain an internal management report that reconciles the data from the Purchasing system (shows need dates, dates purchased, quantity and dollar amount for material purchased, received, inspected and accepted as well as material issued to inventory (if applicable) and then issued to the Project)

- with the data from the accounting system (show dates, dollar values for relative commitments and expenditures).
- b. Pull the report for the last three months and verify the accounting system information and the purchasing system data reconcile.
 - c. Document all discrepancies as compliance concerns
2. Obtain a report from the EVM Cost Tool and compare material BCWS, BCWP and ACWP with the purchasing and accounting data for 5 CAs with material for the last three months.
 - a. Verify the EVM material data (BCWP and ACWP) reconciles with the purchasing and accounting data (dates and dollar values) – may also include estimated actuals in the EVM Cost Tool.
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

16.B.2 Does the information in the labor tracking records reconcile with the accounting records?

Discussion

The labor tracking system typically starts with the manual or automated time keeping system that records performance by charge number. This is then costed in the accounting system where actual employee labor rates are kept. There are several aspects of this process that are critical:

- The timing of labor costing should support weekly labor reports and month-end reconciliation. Labor is typically a significant cost component.
- Labor hours charged should directly reconcile with ACWP hours. Typically, estimated actuals are reported in dollars.
- CAMs should receive labor name reports of actual charges weekly to verify accuracy.
- The CAM should be able to submit adjustments for errors and corrections on a routine basis.

Impact of Noncompliance

Inability to reconcile the EVM Cost Tool ACWP with the accounting system actuals compromises the accuracy of ACWP reported to DOE.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor's accounting process for labor cost accumulation and controls, including time cards.
 - a. Compare accounting labor hours to ACWP hours. The current period and cumulative values should match between the systems, unless estimated actuals are used in the Cost Tool. If so, add the estimated actual labor hours to the accounting labor hours to verify that the totals match.
 - b. Compare accounting labor costs to ACWP costs. The amounts should reconcile, unless estimated actuals are used in the Cost Tool. If they are, add the total labor estimated actuals to the accounting labor costs to verify that the totals match.
2. Conduct 10 sample timecard audits. Is the time tracked consistent with the accounting policy? (Daily, Weekly)
3. Compare the timing of the timecard posting to the accounting system and the recording of the project's labor costs. Is there a significant delay? Is there a significant difference in the reporting of month-end labor hour reporting and the close of the accounting period?

Interview Questions

None

16.B.3 Does the contractor accrue actual costs for the subcontractor in a manner that reflects the actual work performance?

Discussion

Subcontractor costs are normally based on progress payments, invoices, milestone, or subcontractor schedule of values. In some cases, the actuals in the accounting system may not represent 100% of the cost associated with the work completed by the subcontractor for a specified period of time. This may be because of lagging invoices or payment timing, or contractual withholds.

Direct subcontractor costs that have not been formally recorded in the accounting system (due to lagging invoices, etc.) must be recorded in the EVM Cost Tool as estimated actuals for the ACWP in the same period as BCWP. Estimated actuals are reconciled to the accounting records each month to adjust for Invoices received, paid and actual cost recorded. Once direct costs have been recorded, the actual costs replace the estimated actuals recorded in the EVMS.

The source record for subcontract estimated cost is typically the subcontractor ACWP reported in their earned value reports. Generally, there is up to a one month lag that must be accrued as an estimated actual.

Impact of Noncompliance

Failure to ensure subcontractor actual costs (direct or estimated actuals) are consistent with work performed results in inaccurate cost variances and EACs.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor's EVM SD and accounting system manual to determine how Subcontractors direct actual costs are accrued.
 - a. Obtain a list of the major Subcontractors from the prime.
 - b. Obtain the Subcontractor earned value reports that show BCWS, BCWP and ACWP.
 - c. Obtain a report from the EVM Cost Tool that shows BCWS, BCWP and ACWP for Subcontractor CAs (if any).
 - d. Obtain a report from the accounting system that shows Subcontractor payments (actual costs).
 - e. Trace the timing of recorded subcontractor BCWP and ACWP to their underlying rationale and source documents.
 - f. Reconcile the subcontractor reported BCWS, BCWP and ACWP with the prime's EVM Cost Tool to include estimated actuals (if any) and accounting system (ACWP).
 - g. Document all discrepancies as compliance concerns.

Interview Questions

None

16.B.4 Are accounts payable reconcilable or used as a source for estimated actuals?

Discussion

Accounts payable are obligations that are not yet paid. Accounts payable may not have been accrued in the accounting system until payment. However, BCWP must be based on the period when work is completed. Therefore accounts payable, if any, where significant, must be reviewed to see if lagging actuals (ACWP) are present and should be recorded as estimated actuals. Accounts payable must be reconciled with the source documents for earned value claimed (BCWP - such as material receiving reports) and accounting system direct actual costs to determine if actual costs have been booked or not.

Impact of Noncompliance

Lack of reconciliation between accounts payable and ACWP may significantly understate the reported ACWP and result in inaccurate cost variances, EACs, and EVM performance reporting.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Obtain a report from the accounting system and the EVM Cost Tool and trace the monthly direct costs inputs from the accounting system to the EVM Cost Tool.
 - a. Trace monthly direct cost data feeds (contract labor, direct material, estimated actuals, subcontractor estimated actuals, and other data feeds) to the EVM Cost Tool ACWP.
 - b. If estimated actuals are utilized, confirm the instances are documented.
 1. X = Estimated Actuals that are not properly documented
 2. X = 0, pass, X > 0, fail, Tolerance = 0
 - c. Trace the reported ACWP, at the CA at a minimum, in the EVM Cost Tool to the contractor's monthly reconciliation of accounting system direct costs, other data feeds and estimated actuals.
 - d. Verify any differences between booked and estimated actuals and confirm a documented explanation exists.
 - e. Trace estimated actuals, if any, to the contractor's substantiating records in accounts payable. Verify accounts payable are reconcilable with the estimated actuals.
 - f. Document all discrepancies as compliance concerns.

Interview Questions

None

16.B.5 Are cost corrections processed in a timely, consistent manner and are they authorized, and reconcilable?

Discussion

Contractors use journal vouchers or cost corrections to make accounting adjustments for accounting errors, cost transfers, etc. These vouchers or corrections must be authorized and processed as quickly and as consistently as possible before accounting month-end in order to provide current and correct accounting data for performance

measurement. Where a significant journal voucher or cost correction is delayed, estimated actuals must be accrued if warranted.

Impact of Noncompliance

Failure to process authorized journal vouchers or cost corrections for adjustments to the accounting records in a timely, consistent manner negates the accuracy of accounting actuals being available for project use.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor's processes and procedures for processing accounting system journal vouchers (JVs) or cost corrections to ensure they are authorized, processed and reconciled in a timely manner.
 - a. Obtain a report from the accounting system showing journal voucher or cost correction adjustments for errors, cost transfers, etc., and trace them to the actual journal vouchers or corrections. Verify the JVs or cost corrections were authorized, processed and reconciled before accounting month-end.
 - b. Using the same accounting system report referenced above with JVs or cost corrections, verify if there were any delays in processing. If so, obtain a report from the EVM Cost Tool showing estimated actuals and verify if estimated actuals were used to ensure actuals were reported in the same month effort was performed (BCWP claimed).
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

16.B.6 Are anomalies in actual cost (incorrect charges, transfers, etc.) that are identified by the CAM, corrected in a timely manner?

Discussion

Anomalies in actuals identified by the CAM must be corrected before the reporting month-end so corrections are processed before performance reports are run. The month-end actual cost reconciliation is normally 1-5 working days after the accounting month-end. A defined process and documented timetable helps ensure valid cost performance measurement for work performed and/or material purchased.

Impact of Noncompliance

Failure to correct anomalies in actual costs in a timely manner (before performance reports are released) results in inaccurate cost performance measurement, cost variances and may result in an inaccurate EAC reported to the DOE.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the EVM SD and procedures as well as the accounting manual and procedures to determine the contractor's process for identifying and correcting anomalies in actual costs before monthly performance reports are run.
 - a. Obtain the accounting actual costs reports for labor, material and ODC that the CAMs review (and provides corrections to) to ensure correct actual cost charges are being charged to his/her CA/WP.
 - b. Obtain a report from accounting system showing journal voucher or cost correction adjustments to actual costs identified and the date of correction. These adjustments must be entered in the system before monthly performance reports are generated.
 - c. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: What reports do you review to verify actual costs charged to your CAs/WPs are correct? How often do you review these reports?
2. CAM and Business Management: Are corrections made in the accounting system in a timely manner (before performance reports are run)?

16.C Subsection – Accounting Documentation

The accounting system must be formally structured, documented and maintained. Books of account must comply with generally accepted accounting practices. By meeting these requirements, the accounting system, based on the charge number structure created for each project, accumulates actual costs, by element of cost, for transfer to the EVM Cost Tool. Within the EVM Cost Tool, the use of the charge number structure enables the matching of actuals from the accounting system with the budgets established within the CAs down to the WP level. Note: While many contractors choose to collect actual cost

information below the CA level (i.e., at the WP level), this is not required in order to satisfy this guideline.

The guideline is further defined by QE LOI shown below.

16.C.1	Are charge numbers (also called accounts) closed as soon as practical after the completion of the effort?
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QE LOIs Repeated With Discussions

16.C.1 Are charge numbers (also called accounts) closed as soon as practical after the completion of the effort?

Discussion

Completed CAs/WPs are “closed” when their associated accounting charge numbers are closed. Charge numbers associated with CA/WP activities must be closed in a timely manner after the effort is complete to prevent invalid charges from being charged to a completed CA/WP. In exceptional cases, such as indirect rate changes, and Requests for Equitable Adjustment (REAs), there may be unavoidable delays in charge number closure. However, labor charging must always be prohibited after the completion of the task or the task must be reopened and status changed from 100% complete.

Impact of Noncompliance

Failure to close charge numbers for CA/WPs immediately after effort is complete allows the chance for invalid charges to be applied. This would cause ACWP to be incorrect (if the error was not corrected) and would impact the accuracy of the cost reporting and EACs.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the EVM SD and procedures as well as the accounting manual and procedures to determine the contractor’s process for identifying when work is complete and charge numbers must be closed in the accounting system.
 - a. Obtain a report from the EVM Cost Tool that shows current and cumulative CAs/WPs where $BCWP_{cum} = BAC =$ completed work.

- b. Obtain the detailed schedules for the CA/WP level in the IMS and determine when the effort was completed. Can also see this in the CAPs that include status.
- c. Obtain a report from the accounting system that shows the applicable charge number status for the completed effort ($BCWP_{cum} = BAC$) by CA/WP (WP level if the contractor collects actual costs at that level). Verify the charge number was closed as soon as practical after the effort was completed.
- d. Document all discrepancies as compliance concerns

Interview Questions

1. CAM, Project Controls and Accounting: What are the rules for closing charge numbers?
2. Project Controls/Accounting: How do you know when an effort is complete?

Guideline 16 – WBS Typical Artifacts Common to the QE LOIs

- Internal control policy and procedures
- Actual Cost Reports
- Internal Cost Reports reflecting reconciliation of CA direct costs with the general ledger
- Management reports from EVM Cost Tool
- Cost mapping reports to CA
- Contractor CASB Disclosure Statement
- Auditable accounting records
- Reconcilable values at the actual cost charging level; i.e., the charge number level
- Charge number structure for the project
- Labor reports

Guideline 17 - Summarize Direct Costs by WBS Elements

When a work breakdown structure is used, summarize direct costs from control accounts into the work breakdown structure without allocation of a single control account to two or more work breakdown structure elements.

The guideline is defined by QE LOI defined below.

QE LOI Guideline 17

17.A.1	Can direct costs be summarized by element of cost, from the WP/charge number level through the WBS hierarchy?
17.A.2	Does the contractor document the relationships, if any, between schedule activities, charge number (accounts), WPs and control accounts?

QE LOIs Repeated With Discussions

17.A.1 Can direct costs be summarized by element of cost, from the WP/charge number level through the WBS hierarchy?

Discussion

Direct costs are collected, at a minimum, at the CA level and summarized to successively higher WBS level for reporting and performance measurement purposes. To prevent distorting data and related assessments of performance, internal controls are in place to ensure that direct costs collected within CAs are accurately summarized up through the WBS without being allocated to two or more higher level WBS elements. Assurance that accurate cost data is being reported throughout the various levels of the WBS provides project management with the confidence that the data is reliable. Validity of the resulting performance metrics enhances management's ability to make programmatic decisions and properly forecast future costs for the remaining work.

As defined in Guideline 5, the CA is at the intersection of the WBS and OBS. This QE LOI verifies that actual direct costs are summarized through the WBS to the total project level while preserving the EOC integrity. This can be verified at the CA level as well as higher WBS levels. Charge numbers are required in G/L 16 at the CA level and recommended at the WP level (if actual costs are to be collected at that level).

Regardless, the actuals should summarize successfully so that no actual charge numbers are at higher levels and the EOC traceability is maintained in the summarization. The contractor's charge number structure uniquely relates direct costs to the CAs' work performed (and WPs within the CAs if costs are collected at that level) and facilitates the summarization of those costs by the WBS. This practice assures direct costs will be

summarized and reported only within a single WBS element and the costs are directly related to the work performed.

Here is an example to illustrate the intent of the LOI in terms of the ability to summarize by EOC:

WBS	Charge Number	Labor	ODC
1			
1.1	XYZ	1000	500
1.1.1	ABC	50	50

In this limited example of the total project, the intent of the LOI would not be met. The summary WBS 1.1 is not just the summation of the 1.1.1 detail below as the total is > WBS 1.1.1. This example illustrates the effect of charge numbers set within multiple WBS levels, and the resulting lack of traceability by WBS summary and by EOC.

Impact of Noncompliance

Failure to summarize direct costs by WBS prevents the system from ensuring the direct costs reflect the costs associated with accomplishing the scope of work and would result in inaccurate reporting at various WBS levels. If direct costs are not required to be allocated to only one WBS element, the costs in a WBS element would not be directly related to the work performed and performance assessments would be distorted.

Verification Steps

Data Analysis (Automatable)

1. Using the project cost charging structure, examine the project structure, the cost accounting hierarchy and the EVM Cost Tool used to produce the IPMR/CPR Format 1 to verify they preclude the possibility of allocating direct costs from the CA/WP level to more than one higher level WBS element. Using the highest WBS level where ACWP is taken, conduct the following test:
 - a. $X = \text{Count occurrences where WBS levels (current ACWP at WBS level } n) - (\text{Sum of current ACWPs at WBS level } n+1)$ does not equal zero
 - Pass: $X = 0$
 - Fail: $X > 0$
 - Tolerance = 0

Artifact Traces between Documents

1. Obtain the contractor's accounting system cost collection account structure to determine the charge number hierarchy

- a. Obtain the WBS structure (roll-up scheme) showing the hierarchy of the WBS elements, CAs (CAs) and WPs (WPs)
- b. Obtain the contractor's WBS/cost collection mapping showing the relationship between the charge numbers and CAs and/or WPs
- c. Obtain a report from the EVM Cost Tool for five CAs to verify that the direct costs roll up from the accounting system by EOC to the CA/WP/charge number level up through the WBS.
- d. Compare the direct costs in the EVM Cost Tool to the direct costs in the accounting system to ensure they reconcile and are reported accurately. The only difference in direct costs between the accounting system and the EVM Cost Tool would be attributed to "estimated actuals" used for timing differences between effort performed (i.e., material received) and the collection of direct costs (actual costs) in that same period as effort was performed.
- e. Document all discrepancies as compliance concerns

Interview Questions

1. Ask the Accounting Representative to input a "dummy" charge number into the accounting system and allocate it to two WBS elements. Observe whether the contractor's system accepts such an allocation.

17.A.2 Does the contractor document the relationships, if any, between schedule activities, charge number (accounts), WPs and control accounts?

Discussion:

The IMS is the source for work effort and integration between systems. When resources are physically maintained in the IMS, the data transferred from scheduling systems to EVM Cost Tool may be automated which eliminates redundant effort and/or human error in the data transfer. In a non-resource loaded schedule, the IMS activities should be mapped to the WP via coding to preserve cost and schedule integration, and to ensure traceability and consistency between the systems. In the IMS Supplemental Guidance, and or the IMS Data Dictionary, the mapping and coding relationships between the schedule and the EVM Cost Tool must be detailed and outlined.

The Accounting system contains the charge numbers used to collect actual costs and should include the WBS/cost collection mapping showing the relationship between charge numbers and CAs and/or WPs.

The EVM Cost Tool may include activities from the schedule, if resource loaded, but will contain CAs and WPs. The mapping or coding relationships between the EVM Cost Tool, the IMS, and Accounting system direct cost collection must be detailed and outlined per the process.

The key to this QE LOI is that the relationships and levels, if any, between each system must be documented. For example:

- Are charge numbers at or below the WP, or at the CA level?
- Are schedule activities at or below the WP level?
- What codes or methods are used to ensure activities and charge numbers are related to WPs and CAs.

Impact of Noncompliance

Lack of documentation or relationships between activities and charge numbers with WPs/CAs leads to errors in reporting which can impact data validity, analyses, EACs, funding requests and availability.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor's EVM SD and its accounting system manual to determine guidance as to the relationships between activities, charge numbers, WPs and CAs.
 - a. Obtain the contractor's accounting system cost collection account structure to determine the charge number hierarchy
 - b. Obtain the WBS structure (roll-up scheme) showing the hierarchy of the WBS elements, CAs (CAs) and WPs (WPs)
 - c. Obtain the contractor's WBS/cost collection mapping showing the relationship between the accounting system charge numbers and EVM Cost Tool CAs and/or WPs
 - d. Obtain a report from the EVM Cost Tool for five CAs to verify that the direct costs roll up from the accounting system through the WP/CA level to the top WBS level.
 - e. Compare those direct costs in the EVM Cost Tool to the direct costs in the accounting system to ensure they reconcile and are reported accurately. The only difference in direct costs between the accounting system and the EVM Cost Tool would be attributed to "estimated actuals" used for timing differences between effort performed (i.e., material received) and the collection of direct costs (actual costs) in that same period as effort was performed.
 - f. Document all discrepancies as compliance concerns

Interview Questions

None

Guideline 17 – Typical Artifacts Common to the QE LOIs

- WBS
- IPMR/CPR
- Management Reports from EVM Cost Tool
- CA Mapping (Charge number structure that maps to the WBS by CA or WP)*
- Actual costs by CA or WP*
- Actual costs by summary WBS element

**Note: The level of actual costs, CA or WP, is a function of the level at which the charge numbers are established. The “requirement” is for actuals to be collected at the CA level at a minimum. (See GL 16).*

Guideline 18 - Summarize Direct Cost by OBS Elements

Summarize direct costs from the control accounts into the organizational elements without allocation of a single control account to two or more organizational elements.

The guideline is defined by QE LOI define below.

QE LOI Guideline 18

18.A.1	Can direct costs be summarized by element of cost, from the charge number level through the OBS hierarchy?
18.A.2	Does the system prohibit allocation of direct costs to two or more higher level OBS elements?

QE LOIs Repeated With Discussions

18.A.1 Can direct costs be summarized by element of cost, from the charge number level through the OBS hierarchy?

Discussion

Actual costs need to be available at all levels of the OBS. As stated in LOI 17.A.1 and defined in Guideline 5, the CA is established at the intersection of the WBS and OBS. The WBS identifies the work and the OBS identifies who performs the work. This QE LOI is exactly like 17.A.1, except it verifies that actual direct costs are summarized through the OBS to the total project level while preserving the integrity of the EOC. In either case the intent is the same – actual cost collected at the CA level may not be rolled up (i.e., summarized) to multiple higher level elements. This is accomplished to ensure the direct costs reported and analyzed at higher levels of the OBS only reflect the costs associated with the authorized resources to accomplish work.

The contractor's charge number structure uniquely relates direct costs to CAs/WPs and facilitates the summarization by the OBS from the accounting system, to the EVM Cost Tool/CAPs, through the IMS, to the WAD, the RAM and OBS. This practice assures direct costs are summarized and reported only within a single OBS element from CA to the Project level. Assurance that direct costs are accurately accumulated and summarized to provide valid data supports management's effective assessment of performance management information and forecasting of potential future resource requirements and their costs. Also see GL 3 – System Integration.

Impact of Noncompliance

The direct costs reported and analyzed does not reflect the costs associated with the authorized resources identified to accomplish the work and invalidates management's forecasting of future resource requirements and their costs.

Verification Steps

Data Analysis (Automatable)

1. Examine the project structure, the cost accounting hierarchy and obtain a report from the EVM Cost Tool for five CAs to verify that the direct costs roll up from the accounting system by EOC to the CA/WP/charge number level up through the OBS. Using the highest OBS level where ACWP is taken, conduct the following test:
 - a. $X = \text{Count of occurrences where OBS levels (current ACWP at OBS level } n) - (\text{Sum of current ACWPs at OBS level } n+1)$ does not equal zero
Pass: $X = 0$
Fail: $X > 0$

Artifact Traces between Documents

1. Verify the existence of the following:
 - a. Organization charts showing the contractor's organizational hierarchal structure
 - b. Responsibility Assignment Matrix (RAM) showing each of the intersections of the OBS organizations and the WBS elements (i.e., each CA)
 - c. OBS structure (roll-up scheme) showing the relationship of the charge numbers to the OBS
 - d. The project established cost charging structure (mapping of the OBS, WBS, general ledger and project cost ledger), which will help ensure that actual costs are collected by EOC by OBS so that direct comparison with associated budgets can be made at the appropriate organizational level(s).
 - e. Document all discrepancies as compliance concerns

Interview Questions

None

18.A.2 Does the system prohibit allocation of direct costs to two or more higher level OBS elements?

Discussion

The contractor's charge number structure must uniquely relate the direct costs to CAs/WPs and facilitate the summarization of those costs by the OBS. This practice assures direct costs are summarized and reported only within a single OBS element from the CA/WP to the Project level.

Impact of Noncompliance

The costs being reported and analyzed does not reflect the costs associated with the authorized resources to accomplish the work and does not support management's ability to make programmatic decisions and properly forecast future resource requirements.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the existence of the following:
 - a. Organization charts showing the contractor's organizational hierarchal structure
 - b. Responsibility Assignment Matrix (RAM) showing each of the intersections of the OBS organizations and the WBS elements (i.e., each CA)
 - c. OBS structure (roll-up scheme) showing the relationship of the charge numbers to the OBS
 - d. The project established cost charging structure (mapping of the OBS, WBS, general ledger and project cost ledger), which will help ensure that actual costs are collected by OBS so that direct comparison with associated budgets can be made at the appropriate organizational level(s).
 - e. Examine the project structure, the cost accounting hierarchy and the EVM Cost Tool used to produce the IPMR/CPR Format 2 to determine if they preclude the possibility of allocating direct costs from a CA to more than one higher level OBS elements.
 - f. Trace five CAs from the accounting system charge numbers through the internal contractor OBS levels to the IPMR/CPR Format 2 to ensure the costs are not improperly allocated to more than one OBS element.
 - g. Document all discrepancies as compliance concerns

Interview Questions

1. Accounting representative: Please confirm a charge number can only be assigned to a single OBS.

Guideline 18 – OBS Typical Artifacts Common to the QE LOIs

- Project Organizational Chart (to include functional management when applicable)/OBS
- Integrated Project Management Report (IPMR)
- Management reports from EVM Cost Tool
- Responsibility Assignment Matrix (RAM)

- Mapping: OBS, WBS, General Ledger and Project Cost Ledger
 - Charge Number structure that maps to the OBS by CA or WP*
- Actual costs by CA or WP*

*Note: The level of actual costs, CA or WP, is a function of the level at which charge numbers are established.

Guideline 19 - Record/Allocate Indirect Costs

Record all indirect costs that will be allocated to the project.

Guideline 19 and the related QE LOIs are discussed in Section 7.0. This guideline along with guidelines 4, 13, and 24 are described as a whole in Section 7.0 Indirect Guidelines.

Guideline 20 - Identify Unit and Lot Costs

Identify unit costs, equivalent unit costs, or lot costs when needed.

The guideline is defined by QE LOI defined below.

QE LOI Guideline 20

20.A.1	Does the contractor's system have the capability to provide unit costs, equivalent unit or lot costs in terms of labor, material, other direct, and indirect costs if appropriate or required by the project?
20.A.2	Can recurring or nonrecurring costs be identified as necessary or required by the contract?

QE LOIs Repeated With Discussions

20.A.1 Does the contractor's system have the capability to provide unit costs, equivalent unit or lot costs in terms of labor, material, other direct, and indirect costs as required by the project?

Discussion

In a production or manufacturing environment, the contractor's accounting system must have the capability to produce unit, equivalent unit, or lot costs for cost reporting purposes. This may not be applicable in a pure construction, engineering design or similar type of project. This is normally required when (a) there are multiple customers funding individual units or lots or (b) there are future procurements of the same items pending and the information will be used to estimate the costs of those units or lots. Deriving and analyzing changes in unit cost data, especially during production or manufacturing, provides project management insight into the reasons for cost overruns or underruns, and highlights the need for potential changes in how the project is managing cost and schedule.

The accounting system must also be able to segregate the costs of production units, lots, or equivalent units by elements of cost (EOC), (i.e., labor, materials, other direct costs, and indirect costs). If a given unit's cost was determined to be \$100,000, it is important to know, for current negotiation postures and future acquisitions, how much of this cost was because of labor, materials, overhead, and other direct charges.

When multiple units of the same design are being produced in a manufacturing assemble line environment, it is usually sufficient that the accounting system be able to provide "equivalent" unit costs: i.e., the total cost of all the units divided by the number of units produced.

Impact of Noncompliance

The inability of the contractor's accounting system to be able to identify unit costs, equivalent unit or lot costs by EOC (in terms of labor, material, other direct, and indirect costs (as required by the contract)) limits DOE's ability to ensure there is sufficient funding for contracted units and predict the cost of future procurements.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Obtain the contractor's charge number structure by WBS/OBS and MRP cost collection structure and determine how they map to support the identification of unit costs, equivalent unit costs, or lot costs when needed by EOC, including differentiation of work in process.
 - a. Obtain a report from the accounting system to verify the system is capable of accurately providing product unit costs, equivalent unit, or lot costs from the accumulated actual costs in the accounting system. At a minimum, the system must identify these contract costs in terms of labor, material, other direct charges and indirect costs (overhead).
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

20.A.2 Can recurring or nonrecurring costs be identified as necessary or required by the contract?

Discussion

The contractor's accounting system must also be able to distinguish between recurring and non-recurring costs as required by internal/external reporting requirements. Generally, recurring costs are those that would be incurred in continuing production of the product. Nonrecurring costs are those associated with such one-time activities as design development, systems test and evaluation, initial plant layout, training or preparation of technical data and manuals, to name a few. If 50% of a unit's cost of \$100,000 was identified as nonrecurring costs then future negotiations and project acquisition plans could legitimately expect the unit cost in the future to be around \$50,000. Identification of recurring and nonrecurring costs on a contract, and more specifically on a unit-cost basis, provides valuable data for estimating the cost of future acquisitions for both the contractor and DOE.

Impact of Noncompliance

The inability of the contractor's accounting system to distinguish between recurring and non-recurring costs limits the ability to estimate the cost of future acquisitions for both the contractor and the DOE.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Obtain a report from the contractor's material/accounting system to verify the system is capable of the identification of unit costs, equivalent unit costs, or lot costs when needed, including differentiation of work in process.
 - a. Review the Material Requirements Planning (MRP) project cost collection structure and examine the MRP or Enterprise Resource Planning (ERP) system to determine if it supports the identification of product unit costs, equivalent unit, or lot costs when needed, including differentiation of work in progress.
 - b. Verify how recurring and non-recurring costs are identified as necessary or as required by contract for internal/external reporting requirements.
 - c. Document all discrepancies as compliance concerns

Interview Questions

1. Accounting/Material Representatives: How does the system identify recurring and non-recurring costs when required?

Guideline 20 – Typical Artifacts Common to the QE LOIs

- Accounting records
- Internal reporting
- Charge number structure
- General Ledger
- Contractor's Cost Accounting Standards Board (CASB) Disclosure Statement
- IPMR/CPR Formats 1 and 2

Guideline 21 - Track and Report Material Cost/Quantities

Record direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account.

The guideline is further defined by Qualifying Expectations Lines of Inquiry defined below.

Qualifying Expectations Lines of Inquiry Guideline 21

21.A.1	Are material actual costs recorded on the same basis in which budgets were planned at the CA level?
21.A.2	Is the material ACWP in the EVM Cost Tool reconcilable with the direct costs in the accounting system?
21.A.3	Is material ACWP recorded in the same period that earned value is claimed and at the point in time most suitable for the category of material involved?
21.A.4	Is HDV material performance (BCWP) recorded in one of the following ways: 1) upon receipt of material but not earlier, 2) issue from inventory, or 3) consumption of the material?
21.A.5	Does the contractor: 1) Identify the root cause of cost and schedule variances exceeding the thresholds, 2) Identify of the impact of the variance to the CA and total project, 3) Address mitigation or impacts of the variance and related corrective actions?
21.A.6	Does the contractor define HDV and LDV material consistently, and how it will be measured?
21.A.7	Is the level of effort or other non-discrete earned value technique regarding material, limited to Low Dollar Material?
21.A.8	Is HDV material tracked in the IMS discretely; including the purchase request date, need date, and status consistent with the material system?
21.A.9	Does the material system address the various methods of charging material costs from inventory, in accordance with the contractor's procedures?
21.A.10	Does the CAM address price/usage analysis with required variance analysis on HDV material?
21.A.11	Is HDV material tracked in separate WP with separate charge numbers to support price/usage analysis?

QE LOIs Repeated With Discussions

21.A.1 Are material actual costs recorded on the same basis in which budgets were planned at the CA level?

Discussion

The intent of this QE LOI is that actuals are recorded on the same basis as budget and performance are recorded. Material costs must be accurately accumulated within charge numbers and charged to the CA level, at a minimum, using recognized and accepted costing techniques. (Also see guideline 16). These techniques may vary based upon the way material is brought into CAs. For example, material received directly for work that is in process is normally costed to the CA at the invoice amount.

Materials issued from an inventory storeroom/warehouse may be costed to the CA in several different ways:

- On a LIFO basis (Last In, First Out) in which the most recently received units of each type of material are issued first. In inflationary times this process allows the supplier to cost the higher priced materials (just received) to the contracts in-house while retaining the less inflated priced units in inventory as surplus or back-up commodities.
- On a FIFO basis (First In, First Out), in which the first units received of each type of material are also the first units issued for usage. This method is most beneficial when there are large quantities of materials being used which have a short, specific shelf-life of guaranteed usability.
- On an AUC basis (Average Unit Cost) wherein the units being issued for use are taken from the warehouse in a random order with no regard to their time of receipt. An average cost of each unit of each type of material is maintained and updated as each new shipment of materials is received. Then when a unit of material is issued, the CA receiving the distribution is charged with the average unit cost of that material.

Still other materials may be furnished by the customer. In this case, the Government Furnished Materials (GFM) would be costed at no charge when placed into work that is in process. Regardless of the costing method used, the same basis must be used for both budgeting and applying actual costs for materials. If material is supplied as GFM and accounted for at no charge, then the supplier's plan should reflect this in the material budgets of the affected CAs. If a LIFO material accountability system is used for warehoused materials, then the original CA budgets should be estimated with the "Last In, First Out" concept in mind. The way materials are budgeted in CAs is dependent upon the contractor's methodology for accounting for those materials.

Impact of Noncompliance

The direct costs for material items are not assigned to a CA/WP consistent with the corresponding budgets for that material and do not provide a valid basis for realistic evaluation of cost variances and realistic Estimates at Completion (EAC) projections to DOE.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor's Material Management Accounting System (MMAS) manual to determine how materials are ordered, inventoried, and distributed for use.
 - a. Review the contractor's Disclosure Statement and Accounting Manual to determine how material budgets are planned and how material actual costs are allocated.
 - b. Review the contractor's charge number code mapping and verify the mapping helps ensure material costs are accurately charged to CAs using the recognized, acceptable costing techniques. Irrespective of the costing method used, the same method must be utilized for both budgeting and the application of actual costs for materials. Some examples include:
 1. On a LIFO basis (Last In, First Out) in which the most recently received units in inventory of each type of material are issued first.
 2. On a FIFO basis (First In, First Out), in which the first units received of each type of material in inventory are also the first units issued for use.
 3. On an AUC basis (Average Unit Cost), the units being issued for use are taken from the warehouse in an arbitrary order with no special regard to their time of receipt.
 4. The use of Government Furnished Materials (GFM) may result in use of material inventory at no charge, so no corresponding actual costs may be applied.
2. Pull a report from the EVM Cost Tool showing material BCWS, BCWP and ACWP for current and cumulative periods. Select 5 CAs with discrete high dollar value (HDV) material and determine those CAs/WPs with material received/issued in the current period. Trace back to the source data for the material planning, scheduling, budgeting and costing:
 - Purchase Orders - POs should include all required EVM data (including price quotes and delivery schedules) so that the commitment and final payment can be identified to the proper CA/WP.
 - Receiving reports
 - Payment records

- a. Verify via the PO the type and dollar value of the material, the planned need date, the planned receipt date.
- b. Verify via the delivery verification records, the inspection/acceptance or rejection reports and the material receipts the date, quantity and dollar value of material received
- c. Verify via the material vendor invoices the date of the Invoice and the final actual cost for the quantity of material received.
- d. Verify via the charge number mapping that the actual costs (ACWP) were collected/recorded in the same CA as the budgets for the planned material (BCWS) and the material received (BCWP).
- e. Document all discrepancies as compliance concerns

Interview Questions

None

21.A.2 Is the material ACWP in the EVM Cost Tool reconcilable with the direct costs in the accounting system?

Discussion

Unlike other elements of cost, material costs may be reported in the accounting system at various points in the material procurement process (point of receipt to point of payment). The need for accurate comparison of material costs to material budgets and earned value requires that the point of performance and recording of BCWP for the material and the transfer of direct costs from the accounting system to the EVMS occur within the same accounting period.

Actual Cost of Work Performed (ACWP) for material items in the EVM Cost Tool consists of direct costs from the accounting system plus any estimated costs (estimated actuals) recorded in the EVM Cost Tool. For those costs that have not yet accrued for material received or used in the same accounting month. These costs must be reconciled monthly between the EVM Cost Tool and the accounting system.

Situations may arise that cause timing differences between receipt or use of the material and recording of the actual costs (lagging Invoices, etc.) in the accounting system. For example, the material may come in this month with earned value (BCWP) being taken on receipt and inspection but the vendor's invoice might arrive the following month (accounts payable needs the invoice to write the check). In this case, if estimated actuals were not applied, there would be earned value (BCWP) with no actual costs (ACWP) for the month when material was received. To avoid distortion of the earned value variances, estimated actuals are entered into the EVM Cost Tool based on the purchase order and receiving report and reported as part of the ACWP. When actual costs are ultimately recorded in the accounting system, the estimated actuals in the EVM Cost Tool must be reconciled with or replaced by the recorded actuals so as not to double book actuals for that material for that month.

Impact of Noncompliance

Irreconcilable actuals diminishes the usefulness of cost variance and prevents accurate and effective performance management.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor's EVM SD and procedures and the Accounting Manual and procedures to understand the contractor's processes for ensuring the EVM Cost Tool ACWP (using estimated actuals if necessary) and the accounting system actual costs reconcile.
 - a. Obtain a report from the EVM Cost Tool for material actual costs (ACWP). Also pull an estimated actuals report and verify if estimated actuals were used.
 - b. Obtain a report from the accounting system showing material actual costs.
 - c. Compare the actual costs in the EVM Cost Tool (including estimated actuals, if applicable) with the actual costs in the accounting system records. The actual costs in the accounting system plus any estimated actuals must equal the ACWP in the EVM Cost Tool.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

21.A.3 Is material ACWP recorded in the same period that earned value is claimed and at the point in time most suitable for the category of material involved?

Discussion

A material control system must address the following characteristics for planning material categories and supporting performance measurement:

- Comparison of BCWP to BCWS and BCWP to ACWP
- Generally acceptable points for measuring material item performance

Actual Cost for Work Performed (ACWP) is directly related to the work performed (material received and/or used) and must be collected and/or recorded in the same month that earned value (BCWP) is claimed for the material received and/or used. This provides the correct basis to perform valid cost variance analyses and forecast valid estimates at completion (EACs). In those cases where actual costs (ACWP) are not available in the

accounting system in the same month the material is received and/or used and earned value (BCWP) is claimed, estimated costs (estimated actuals) must be recorded and reported in the EVM Cost Tool to ensure accurate performance measurement.

Earned value (BCWP) for material must be claimed at the point in time most suitable for the type of material. The material budget (BCWS) must be time-phased by dollar amount and to the period in time when the earned value (BCWP) is expected to be claimed and the actuals costs (ACWP) recorded in the EVM Cost Tool. BCWP for material may be claimed at any point-in-time after its receipt which is most suitable to the contractor, but no later than point of payment. The need for accurate comparison of material costs to earned value and material budgets requires that the appropriate point of performance measurement for material is established based on need dates for that material.

- Performance is recorded at inspection, receipt and acceptance of material for high-dollar/critical material. This applies to material items that are placed into use within a reasonable time or are specifically identified to a serially numbered end item.
- For other material, performance is recorded when:
 - Material is placed in stock
 - Material is accrued, used or released to work in process
 - Payments representing physical progress are made
 - Inventory costs are allocated to a requirement
 - Delivery to the user (i.e., for direct delivery material)

As previously stated, the ACWP for material must be collected and recorded in the same month as material performance is claimed (BCWP).

Impact of Noncompliance

If actual costs (ACWP) are not collected and recorded correctly in the same period the material is inspected/received and/or used and earned value (BCWP) is claimed, ACWP for that material is incorrect and does not provide valid data to perform correct cost variance analyses nor forecast valid EACs.

Verification Steps

Data Analysis (Automatable)

Note: Current period = “cur” and Cumulative period = “cum”.

1. Verify there is no material cum Actuals taken without corresponding performance.
 - a. $X = \text{Material ACWP}_{\text{cum}}$ where $\text{material ACWP}_{\text{cum}} > 0$ and $\text{material BCWP}_{\text{cum}} = 0$
 $Y = \text{Material ACWP}_{\text{cum}}$
 - b. Pass: $X/Y = 0$
Fail: $X/Y > 0$
Tolerance = 0

2. Confirm there is no material cum performance applied without corresponding Actuals.
 - a. $X = \text{Material BCWP}_{\text{cum}}$ where material $\text{BCWP}_{\text{cum}} > 0$ and material $\text{ACWP}_{\text{cum}} = 0/Y = \text{Material BCWP}_{\text{cum}}$
 - b. Pass: $X/Y = 0$
Fail: $X/Y > 0$
Tolerance = 0
3. Confirm there is no material current performance applied without corresponding Actuals.
 - a. $X = \text{Material BCWP}_{\text{cur}}$ where material $\text{BCWP}_{\text{cur}} > 0$ and material $\text{ACWP}_{\text{cur}} = 0/Y = \text{Material BCWP}_{\text{cur}}$
 - b. Pass: $X/Y = 0$
Fail: $X/Y > 0$
Tolerance = 0

Artifact Traces between Documents

1. Pull a report from the EVM Cost Tool showing material BCWS, BCWP and ACWP for current and cumulative periods. Select 5 CAs with discrete high dollar value material and determine those CAs/WPs with material received in the current period. Trace back to the source data for material planning, scheduling, budgeting and costing.
 - a. Verify via the PO the type and dollar value of the material, the planned need date, the planned receipt date.
 - b. Verify via the delivery verification records, the inspection/acceptance or rejection reports and the material receipts the date, quantity and dollar value of material received
 - c. Verify via the material vendor invoices the date of the Invoice and the final actual cost for the quantity of material received.
 - d. Pull a report of estimated actuals from the EVM Cost Tool.
 - e. Compare the source data with the EVM Cost Tool Report to verify that ACWP was collected/recorded/reported in the same month that the material was inspected and received or used and earned value (BCWP) was claimed.
 - f. Document all discrepancies as compliance concerns
2. Confirm there are no actuals taken on completed material CAs or WPs, as applicable. Using the EVM Cost Tool output, verify there is no material ACWP taken on completed work ($\text{BCWP}=\text{BAC}$), take care to evaluate any estimated actual adjustments. Use the following test to confirm:
 - a. $X = \text{ACWP}_{\text{cur}}$ for material CA/WP with ACWP_{cur} with $\text{BCWP}_{\text{cum}} = \text{BAC}$ and $\text{BCWP}_{\text{cur}} = 0/Y = \text{Excluding adjustments for Estimated Actuals, ACWP}_{\text{cur}}$.
Document all discrepancies as compliance concerns

Interview Questions

None

21.A.4 Is HDV material performance (BCWP) recorded in one of the following ways: 1) upon receipt of material but not earlier, 2) issue from inventory, or 3) consumption of the material?

Discussion

Budgets for critical or high value material, must be planned discretely using objective milestones or other rational basis for measuring the amount of material consumed. This would include multiple deliveries of the same item for which a series of sequential milestones would be listed. For inventory material, the contractor may choose a percent complete, a milestone for each “kit” of material issued to work in process (WIP), or another EV technique that accurately reflects the issuance to this type of material. For material that will be released in kits, determine how BCWP and ACWP are determined at the time of partial kit releases.

Performance for HDV/critical material items may be planned (BCWS) and claimed (BCWP) based upon receipt, inspection, and acceptance, provided the material items are placed into use within a reasonable time or are specifically identified to a serially numbered end item. This point of performance must be established no earlier than the actual receipt of the material items. This prevents the early assessment of progress for material that may ultimately be cancelled and for which earned value would have to be reduced.

While progress payments and/or schedule of values alone may not be used for progress assessment, technical and/or quantifiable backup data used to document performance may be used as objective milestones. The reason is that progress payments and schedule of value are not schedule accomplishments. It is the technical progress that must be used for earned value.

There may be situations where the contractor may offset the planning of material budgets (BCWS) to coincide with the payment of the vendor’s invoice. This is done primarily to ensure that BCWP for the material and the costs for that material are reported within the same accounting period. This approach is acceptable only if (a) the actual consumption of the material occurs within a reasonable time-frame of the payment (usually 30 days or one accounting period) and (b) it is not used as an across-the-board approach to material BCWP management for all categories of material.

Impact of Noncompliance

Failure to track HDV material may cause overall project delays.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor's EVM SD for the discussion as to how High Dollar Value (HDV) material is planned, scheduled and budgeted. Determine the type of EV techniques allowed.
 - a. Verify the SD requires that HDV material is tracked discretely no earlier than receipt.
 - b. Obtain the IMS and determine if HDV material is identified and tracked in the schedule and EV techniques are also identified. If so, verify HDV material is tracked with discrete EV techniques to occur no earlier than inspection and receipt of the material. Perform trace by exception to see if there are any LOE EV techniques applied to the HDV material items. There should be no LOE EV techniques applied to the HDV material items. Confirm with the following test:
 1. If SD defines HDV material, $X = \$ \text{ value of HDV material (per SD) with LOE or PERT EVT} / Y = \text{total } \$ \text{ value of material BAC}$
Document all discrepancies as compliance concerns
2. Obtain a report in the EVM Cost Tool and verify HDV material EV techniques are discrete techniques. Perform trace by exception to see if there are any LOE EV techniques applied to the HDV material items. There should be no LOE EV techniques applied to the HDV material items.
 - a. Document all discrepancies as compliance concerns
 - b. Verify the BCWP reported for HDV CAs.
 - c. Is there a schedule variance? Does the schedule variance reconcile with the material receipts and delays?
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

21.A.5 Does the material system provide for the accountability for all material purchased for the project including material issued to control accounts, return of unused material, scrap quantity and disposition, and residual inventory?

Discussion

Records must be kept to provide for full and complete accountability of all materials purchased for the contract or furnished as GFM/GFE. These records must reflect the acquisition, issue to CAs, return of unused materials from CAs, scrap quantity and disposition, and residual material inventory. Normally, any unused material should be returned to stores/warehouse for disposition. Actual direct material costs include the materials in the final product, scrap, damaged materials, and so forth, plus any material purchased for the contract but not used, for which an alternate use cannot be found. However, unit cost projections for follow-on procurements must include material consumed

plus material requirements for schedule assurance based on waste and spoilage trends determined from an appropriate phase of the contract performance.

All material purchased or furnished as GFM/GFE must be fully accounted for on a particular project. Actual direct material costs includes the materials in the final product, scrap, damaged materials, any material purchased for the contract but not used for which an alternate use cannot be found and any residual inventory.

Impact of Noncompliance

Without full material accountability requirements material cost projections are not dependable and would result in an invalid EAC.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Pull an internal report from the Material Management and Accounting System (MMAS) to verify the system has the ability to account for all material purchased (e.g., material issue to CAs, return of unused material, scrap quantity and disposition and residual inventory).
 - a. Manual check to see if the MMAS has been approved.
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

21.A.6 Does the contractor define HDV and LDV material consistently, and how it will be measured?

Discussion

In general, budgets for all material, to include critical or high value production material, must be planned discretely using objective milestones or other rational basis for measuring the amount of material consumed. An analysis needs to be conducted to identify and differentiate between high value critical material from low value consumable-type material. All material is treated as high value in the absence of a criticality assessment of material classes and categories defined in the EVM Cost Tool and the material control system, respectively. Contractors must minimize intermingling of discrete and Level of Effort (LOE) within material CAs. Because of the significance of HDV material to the project, HDV material WPs must also be segregated to allow for analysis and the ability to quickly determine impacts to the project.

A Material control system is a generic term and is not intended to imply that the contractor must have a fully automated system(s) to manage the material process and interfaces with the EVMS.

How is high dollar value determined? This will vary by contractor. The general guidance is to follow the PARETO principle as applied to material: That 80% of the cost will relate to 20% of the items, and the reverse that 80% of the items relate to 20% of the cost. Using this method, the Bill of Material (BOM) is sorted by total extended cost (units X individual price). The material is sorted by extended cost and the point at which approximately accounts for 80% a line is drawn. Material above the line is labeled HDV; material below the line is LDV.

The alternate method of determining HDV is by category of material. For example, there may be purchase orders, catalogue, and consumables. Typically, consumables, such as nuts and bolts, and other small items are identified as LDV. Purchase Orders are one of a kind or significant that need tracked in the schedule is HDV. Catalogue could be either HDV or LDV by magnitude.

Regardless of the method, care should be taken on marginal items above or below the assessed 80% line or other method assessment. Anything that should be scheduled should also be a candidate for HDV. Anything bought routinely in the 1,000s may always be a candidate for LDV treatment. The rules above are general guidance so the marginal items can be assessed manually.

Impact of Noncompliance

The inability of the contractor to identify Material Categories, such as HDV and LDV material, would result in inefficient recording and reporting of material costs and would impact the EAC reported to DOE.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor's EVM SD and Procedures and their Material Management and Accounting System (MMAS) guidance as well as their Disclosure Statement and verify the contractor has defined HDV and LDV material and describes how each will be tracked in their system.
 - a. Review the Discloser Statement and document the material categories described.

- b. Pull a report from the Material Management Accounting System (MMAS) and verify the system identifies material by category match the disclosure statement. Document list of categories of material.
- c. Pull a report from the accounting system and verify the system identifies the same material by category. Document list of categories of material.
- d. Document all discrepancies as compliance concerns

Interview Questions

None

21.A.7 Is the level of effort or other non-discrete earned value technique regarding material, limited to Low Dollar Material?

Discussion

There are situations where material can be planned and measured as LOE. This is normally the case where material is of a supportive nature and can include rentals, leases and maintenance contracts; or other low dollar value (LDV) common material items such as lubricants and miscellaneous hardware, or bulk items (screws, fasteners, bolts, etc.), electronics, and spare and replacement parts that are purchased on an as-needed basis. Contractors should minimize the intermingling of discrete and LOE effort within material CAs.

Note that the PERT cost method of actuals/EAC is recommended instead of LOE for LDV material. This technique allows for a schedule variance if the bulk purchases are delayed, and minimizes the need for analysis of a false LOE variance without the burden of HDV assessment. PERT cost does require an assessment monthly of the currency of the EAC.

For LDV or bulk items (screws, fasteners, bolts, etc.), the use of a formula to derive BCWP or the use of LOE are appropriate EV techniques. In these cases, the LOE BCWS may be planned based on expected payments for the LDV material and actuals (ACWP) would be transferred to the EVM Cost Tool upon payment. For some LDV material items, BCWP may be calculated using a formula method, such as the Project Evaluation and Review Technique (PERT) Cost Formula. This method calculates BCWP by comparing the actual cost of received material (ACWP) to the expected total cost for that material (EAC) and applying the resulting percentage to the originally budgeted value for the material (Budget at Complete (BAC)), $BCWP = (ACWP/EAC) \times BAC$. The use of this method requires that the EAC be evaluated and updated every month. This method is only appropriate for high quantity, low-value and low-risk material items (e.g., material that is consumable such as bolts, fasteners, welding rods, etc.). Any other material items labeled as low value must have defined controls regarding price and/or quantity considerations and ensure performance measurement will not be skewed without adequate consideration of price variability, price ranges, as well as, similar or like categories of material.

Impact of Noncompliance

The inability of the accounting or material system to identify Material Categories would result in inefficient recording and reporting of material costs which would prevent accurate and effective performance management.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor's EVM SD for the discussion as to how LDV material is planned, scheduled and budgeted. Verify the SD limits LOE to LDV and does not apply it to HDV material.
 - a. If EV techniques are identified in the IMS, obtain a copy for the last three reporting periods and verify LOE EVTs are only applied to LDV material and not HDV material. Trace the LDV material to verify LOE is applied to that category of material. Trace the number of HDV material items with LOE EV techniques to verify LOE is NOT applied to HDV material.
 - b. Obtain a report from the EVM Cost Tool for the last three reporting periods and verify that the LOE EV technique is limited to LDV material and is not used for HDV material. Trace the LDV material to verify LOE is applied to that category of material. Trace the number of HDV material items with LOE EV techniques to verify LOE is NOT applied to HDV material.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

21.A.8 Is HDV material tracked in the IMS discretely; including the purchase request date need date and status consistent with the material system?

Discussion

The Contractor must specify material items and quantities early enough in the project in order to ensure sufficient ordering and receiving time prior to the material item need dates. This includes planning and tracking the HDV material in the schedule by PO, the requirement and anticipated need and receipt dates. This also includes applying values to the material items based on price lists, vendor quotes, inventory values or other verifiable sources. Performance measurement schedules and budgets within CAs will be based on the result of this activity.

In the IMS, for HDV material, special attention must be paid to the appropriate predecessor and successor relationships to HDV receipt activities or milestones, to quickly evaluate status in terms of the criticality of the material to the project. The IMS must be

statused per the material management system for consistency. In the IMS, float values must be reviewed, in order to fully predict and mitigate any need date, critical path or driving path impacts resulting from material delays.

Impact of Noncompliance

If the HDV material is not tracked in the schedule with the requirement, PO, and anticipated receipt date by purchase order, as well as need date, the Project may not allow sufficient ordering and receiving time for the material to arrive by the Project need dates which would not contribute to the success of the Project.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor's EVM SD for the discussion as to how High and Low Dollar material is planned, scheduled and budgeted.
 - a. Obtain the IMS and determine if HDV material is identified and tracked in the schedule. If so, verify it is tracked by PO, requirement, need date and anticipated receipt date.
 - b. Obtain in internal report from the MMAS and verify the HDV is tracked by PO, requirement, need date and anticipated receipt date.
 - c. Compare the two reports and verify they reconcile.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

21.A.9 Does the material system address the various methods of charging material costs from inventory, in accordance with the contractor's procedures?

Discussion

Material costs must be accurately accumulated within charge numbers using recognized, acceptable costing techniques identified in the contractor's CAS Disclosure Statement. These methods may vary based upon the way the material is brought into the CAs.

Materials issued from an inventory storeroom/warehouse, may be costed to the using CA in several different ways: Materials issued from an inventory storeroom/warehouse, may be costed to the using CA in several different ways: (1) On a LIFO basis (Last In, First Out) in which the most recently received units of each type of material are issued first. In inflationary times this process allows the supplier to cost the

higher priced materials (just received) to the contracts in-house while retaining the less inflated priced units in inventory as surplus or back-up commodities. (2) On a FIFO basis (First In, First Out), in which the first units received of each type of material are also the first units issued for usage. This method is most beneficial when there are large quantities of materials being used which have a short, specific shelf-life of guaranteed usability. (3) On an average unit cost (AUC) basis wherein the units being issued for use are taken from the warehouse in a random order with no regard to their time of receipt. An average cost of each unit of each type of material is maintained and updated as each new shipment of materials is received. Then when a unit of material is issued, the using CA is charged with the average unit cost of that material.

Regardless of the costing method used, however, the same basis must be used for both budgeting and applying actual costs for materials. If a LIFO material accountability system is used for warehoused materials, then the original CA budgets should be estimated with this "Last In, First Out" concept in mind. The way materials are budgeted for in CAs must be dependent upon the supplier's methodology for accounting for those materials.

Impact of Noncompliance

The actual material costs for material issued from inventory is not accurately accumulated and assigned to the appropriate CAs and the cost variances and EACs are invalid.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor's CAS Disclosure Statement and determine the methods of charging material costs from inventory.
 - a. Obtain an internal report from the material accounting system to verify the assignment and allocation of the material to the project CAs is aligned with how materials are budgeted in the CAs.
 - b. Using the same internal report, verify the actual material costs are accurately accumulated and assigned to the appropriate CA using the recognized and accepted methods for charging material costs from inventory.
 - c. Obtain a report from the EVM Cost Tool and compare data between this report and the material accounting system report to verify the planned, performed and actual costs are applied the same. May need to include estimated actuals in the EVM Cost Tool if applicable.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

21.A.10 Does the CAM address price/usage analysis with required variance analysis on HDV material?

Discussion

Material CVs (that is the difference between the budgeted and actual costs of the work performed (BCWP - ACWP = CV)) can be divided into two sources or causes: price variance (PV) and usage variance (UV).

Price Variance: PV is the difference between the budgeted cost for the BOM (based upon engineering drawings and technical orders, etc.), including planned quantities for testing and scrap, and the price paid for the BOM. By formula:

$$PV = (\text{Budgeted unit price} - \text{Actual unit price}) \times (\text{Actual Quantity})$$

The PV can be determined early in the contract when the materials are ordered and can be used in projections of the estimate of cost at completion. The PV is of prime importance to those responsible for ordering material.

Usage Variance: Unlike a PV which can be determined early in the contract when the materials are ordered, UV can occur throughout the PoP. Normally, UVs are the resultant costs of materials used over and above the quantity called for in the BOM. Certainly, however, there are instances where less material than anticipated in the BOM is used. So a UV is simply the cost of materials usage that is different than the anticipated (budgeted) material usage. By formula it is represented as follows:

$$UV = (\text{Budgeted Quantity} - \text{Actual Quantity}) \times (\text{Budgeted Unit Price})$$

So while the PV is of prime importance to those responsible for ordering material, the UV is of prime concern to those responsible for controlling the quantity of materials used. Planning for material usage allowances to cover scrap, test rejections, unanticipated test quantities, and the like, is a practical necessity and the supplier should have records of such provisions. The more uncertain the expected usage, the more important it is to have a good plan and to keep track of performance against it (particularly for contract-peculiar materials or materials which require long procurement lead times). Analyzing and determining current and projected UVs can provide important, continuing internal measurement.

Impact of Noncompliance

Without material price and usage variance analysis the EAC projections are invalid where applicable.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review Purchase Requisitions, Purchase Orders, Invoices and material accounting reports to verify that the contractor's material accounting system quantifies material Price Variance (PV) by comparing commitment values to the actual material costs. Document all discrepancies as compliance concerns.
2. Review the contract Bill of Material (BOM), purchase requisitions, purchase orders, invoices, material accounting and scrap/usage reports to compare actual material quantities to budgeted quantities. Multiply the budgeted material prices by the difference in actual vs budgeted quantities to verify the contractor's material Usage Variance (UV). Document all discrepancies as compliance concerns.
3. Obtain a report from the material accounting System and the EVM Cost Tool (Variance Analysis Reports (VARs)) that show material price and usage variances.
 - a. Compare the two to ensure the formulas are being correctly utilized and variances reported in both systems (if applicable).
 - b. Document all discrepancies as compliance concerns.

Interview Questions

None

21.A.11 Is HDV material tracked in separate WP with separate charge numbers to support price/usage analysis?

Discussion

Budgets for HDV or critical material must be planned discretely, in separate WPs, using objective milestones or other rational basis for measuring the amount of material consumed. If actual costs are taken at the CA level this would require separate HDV CAs to enable price usage variance. WPs may have multiple HDV items in same WP as would support price/usage analysis. Note QE LOI 12.A.7 restricting comingling of LOE and discrete applies equally to HDV and LDV in the same CA, which is limited to 20% LDV in an HDV CA.

Impact of Noncompliance

Without segregation by WP and charge number for tracking and analysis, HDV material can mask true performance trends.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor's EVM SD for the discussion as to how HDV material is planned, scheduled and budgeted.
 - a. Obtain the EVM Cost Tool output and verify HDV is segregated by WP and charge number, corresponding to the material system.
 - b. Compare the three reports and verify they reconcile.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

Guideline 21 – Typical Artifacts Common to the QE LOIs

- Priced Bill of Materials (BOM)/Indenture parts list for material
- Internal contractor performance reports reflecting material-related performance
- CAPs
- Material commitment reports, inventory reports, purchase orders, and payment records
- Estimated actuals log
- Material control records
- Purchase Order Commitment
- Material Receipt and Acceptance
- Inventory records for project items
- Residual Material on hand or projected at completion
- Defined and documented categories of material
- Management reports from EVM Cost Tool
- Variance Analysis Reports (VARs)

SECTION 5.0 ANALYSIS AND MANAGEMENT REPORTING (GUIDELINES 22 – 27)

The Analysis and Management Reporting category focuses on management use of the Earned Value Management System performance data to detect and act upon early technical, schedule, and/or cost deviations from the Performance Measurement Baseline (PMB). The six guidelines (22 – 27) that comprise this category establish the minimum requirements for generating and analyzing cost and schedule variances (Guidelines 22 and 23), establishing and implementing corrective action plans (Guideline 26), and maintaining credible Estimates at Completion (EAC) at both the control account and total project levels (Guideline 27). The performance data used for variance analysis must be generated from the EVMS. To ensure cost and schedule variances are valid, the EVM method used to derive the BCWP must be consistent with the method used to plan and resource the associated work. (See Guidelines 10 and 12.) The applicable actual direct costs must map or trace to the accounting system. (See Guidelines 16 and 21.) These minimum requirements facilitate the Control Account Managers' (CAMs') ability to identify significant cost and schedule performance drivers and use that information to make informed programmatic decisions that will optimize the use of resources to accomplish the remaining work.

Consideration of the impact of indirect cost performance on the overall cost of the project is also included in this category. The guidelines require analysis of indirect cost performance and their impacts to the Estimates to Complete (ETC) for the remaining work (Guideline 24 – see Section 7.0 Indirect Guidelines). The guidelines further require the performance data to be accurately summarized from the control account level to the contractually mandated reporting level so that the same data being used to internally manage and execute the project is being communicated externally to the government (Guideline 25.) This ensures all project stakeholders are informed of progress and allows for management action to address identified problems and/or risks to project execution (Guideline 26).

Lastly, the guidelines require the contractor to periodically evaluate and update ETCs and derive control account and project level EACs that reflect a valid projection of project cost. Timely and reliable EACs provide the project manager visibility into future resource needs and support the government's ability to provide sufficient funding to the project (Guideline 27).

DOE's interpretation of the analysis and management reporting guidelines follows.

Guideline 22 - Calculate Schedule Variance and Cost Variance

At least on a monthly basis, generate the following information at the control account and other levels as necessary for management control using actual cost data from, or reconcilable with, the accounting system:

- 1. Comparison of the amount of planned budget and the amount of budget**

earned for work accomplished. This comparison provides the schedule variance.

2. Comparison of the amount of the budget earned and the actual (applied where appropriate) direct costs for the same work. This comparison provides the cost variance.

Discussion

The emphasis of this Guideline depends on accurate cost and schedule performance data generated on a routine basis. In order for project management to assess both progress and variances as compared to the baseline, reliable and auditable data must be generated in a timely manner, on a monthly basis at a minimum in alignment with the contractor's accounting reporting periods.

For analysis and variance reporting, the following data elements must be identified, on a periodic basis, at the CA level:

- Budgeted Cost for Work Scheduled (BCWS), represents the amount of work planned
- Budgeted Cost for Work Performed (BCWP), represents the amount of work actually accomplished
- Actual Cost of Work Performed (ACWP), represents the actual cost of the work accomplished traceable through the accounting system

The comparisons of BCWP versus BCWS, and BCWP versus ACWP, results in two variances:

- BCWP minus BCWS results in the CA's Schedule Variance (SV)
- BCWP minus ACWP results in the CA's Cost Variance (CV)

The guideline is defined by QE LOI defined below.

22.A.1	Is information generated on a monthly basis at a control account level (at a minimum), which includes schedule variance, cost variance, and variance at completion (as developed in Guideline 27)?
22.A.2	Are the formulas to calculate SV, CV, and VAC consistent with the DOE Gold Card?
22.A.3	Is the measurement of cost and schedule performance consistently applied throughout the project?
22.A.4	Does the Contractor perform analysis at the lowest level where BCWS is planned, BCWP is earned, and ACWP is collected?
22.A.5	Are BCWP calculations consistent with the manner in which the work is planned?
22.A.6	Where EV Flow down applies, does the prime contractor assess subcontractor EV performance data, assess the need for adjustments and maintain reconciliation for any difference in reporting in the prime EVM Cost Tool?

22.A.7	For subcontractors without an EVM flow down requirement, does the prime contractor assess subcontractor performance based on a plan containing objective indicators for measuring subcontractor performance?
22.A.8	Are variance thresholds identified and documented in the EVM procedures?
22.A.9	Do CAMs develop and approve the Variance Analysis and is it approved consistent with the OBS?

QE LOIs Repeated With Discussions

22.A.1 Is information generated on a monthly basis at a control account level (at a minimum), which includes schedule variance, cost variance, and variance at completion (as developed in Guideline 27)?

Discussion

Schedule and cost variances are calculated using performance data generated from the EVM Cost Tool and are used to assess deviations from the Performance Measurement Baseline (PMB). At a minimum, cost and schedule variances are calculated at the control account level on a monthly basis for analysis and variance reporting. As work is progressed and statused based on assigned earned value techniques, the corresponding budget value is “earned” and is represented as the Budgeted Cost for Work Performed (BCWP). This represents the project performance to plan. (See Guidelines 7 and 10). The applicable actual direct costs must map or trace to the accounting system. Using BCWP as a basis of work achievement, BCWP is compared to the planned Budgeted Cost for Work Scheduled (BCWS) and the Actual Cost of Work Performed (ACWP) resulting in the calculation of schedule and cost performance status:

- BCWP minus BCWS results in the CA's Schedule Variance (SV)
- BCWP minus ACWP results in the CA's Cost Variance (CV)

Differences between the Budget at Complete (BAC) and Estimate At Completion (EAC) projections (see Guideline 27) result in the Variance at Completion (VAC). The VAC is calculated at the control account, at a minimum, and Summary Level Planning Package (SLPP) level. An analysis of the difference should include what underlying elements of work caused the deviation from the BAC, and what corrective actions, if any, are being implemented to minimize the cost overruns.

- BAC minus EAC results in the CA's Variance at Completion (VAC)

The resulting variance analysis will provide early insight into schedule and cost status for improved visibility of project performance. (See Guideline 23.)

Impact of Noncompliance

Unless variances are calculated and analyzed routinely using EVM data, project management is unable to accurately assess the impact of deviations from the Performance Measurement Baseline (PMB).

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm that a monthly (or more frequently if mandated) EVM report is generated from the EVM Cost Tool.
 - a. Verify the reporting frequency as noted in the System Description and the Project documentation.
 - b. Review the current IPMR/CPR report to ensure current and cumulative cost and schedule variances, as well as variance at completion are calculated for all in progress and completed CAs.
 - c. All variances must be calculated for this monthly (or more frequently if mandated) report.

Interview Questions

None

22.A.2 Are the formulas to calculate SV, CV, and VAC consistent with the DOE Gold Card?

Discussion

The DOE Gold Card includes standard formulas for calculating CVs, SVs and VACs which must be followed to ensure accurate variances are being reported. The formulas follow:

$$CV = BCWP - ACWP$$

$$SV = BCWP - BCWS$$

(These may be based on current period or cum-to-date numbers, depending on the application)

$$VAC = BAC - EAC$$

Impact of Noncompliance

Use of analysis based on variances generated by non-standard formulas will result in a lack of standardized reporting, resulting in management being compromised in their ability to accurately identify and report areas in need of attention.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the formulas used to calculate SV, CV, and VAC.
 - a. Download the DOE EVMS Gold Card.
 - b. Use the EVM Cost Tool Data (CA level) or the monthly IPMR/CPR (CA or WBS Level) to confirm correct calculations for Schedule Variance (current period and cumulative), Cost Variance (current period and cumulative) and Variance at Completion. Also confirm the calculations for CV % and SV %.
 1. If using the EVM Cost Tool, select 10 CAs for use to verify the calculations.
 2. If using the IPMR/CPR, select 10 WBS for use to verify the calculations.
 - c. The following formulas are the correct formulas from the DOE Gold Card:
 1. Cost Variance = BCWP - ACWP
 2. Schedule Variance = BCWP - BCWS
 3. $CV\% = (CV/BCWP)*100$
 4. $SV\% = (SV/BCWS)*100$
 5. Variance at Completion = BAC - EAC
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

22.A.3 Is the measurement of cost and schedule performance consistently applied throughout the project?

Discussion

It is important that the fundamentals of EVM are applied consistently across all CAs, and through the various levels of the WBS and OBS. The contractor's EVMS SD describes the implementation of an EVMS compliant method of project management. Following the SD ensures that all project team members understand the methodology to measure and report EVM performance using the same methods.

Impact of Noncompliance

When the fundamentals of EVM are not standardized across the project, management is unable to make effective project management decisions based on the information provided or utilize the predictive capability of the EVM data to identify project risks and opportunities.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

None

Interview Questions

1. CAM: Describe the selection process for establishing the EVM method while planning your CAs, and then how you use that method to claim performance.
2. Project Controls: How do you check to make sure the performance claimed in the IMS is reflected in the EVM Cost Tool?

22.A.4 Does the Contractor perform analysis at the lowest level where BCWS is planned, BCWP is earned, and ACWP is collected?

Discussion

The contractor's SD or procedures describe the process for calculating CVs, SVs, and VACs. In order to determine the variances, three variables (BCWS, BCWP and ACWP) must be available and be aligned with the exact same scope of work. The contractor must determine the level that provides sufficient visibility to determine the root causes of the variances (whether it is at the control account level or below).

Data must be provided to the CAMs that show a breakout by element of cost (EOC), which is typically one level below the level of planning (WP). For example, analysis of a labor WP's cost variance should include analysis of the labor hour usage, labor rates, etc. In another example, analysis of a material WP's schedule variance should include analysis by material type, other direct costs, etc. Root cause analysis at the right level allows for correct identification of cost and schedule drivers, leading to effective corrective action planning (See Guideline 26).

The guidelines do not mandate collection of actual costs below the control account level. However, analysis of cost variances by element of cost should be done at the lowest possible level. Additionally, schedule variance analysis must also be performed at the

lowest level where BCWP and BCWS can be compared, with additional insight gained through analysis of work progress for activities/activities in the IMS at the lowest level.

Impact of Noncompliance

Without analysis at the lowest levels, trends are not managed to minimize the impacts at the higher levels.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm the System Description or related documentation outlines the procedure for calculating variances:
 - a. Conduct a manual check to confirm these procedures outline cost and schedule variance calculation at the lowest level where BCWS, BCWP and ACWP are collected.
 - b. Cost variance calculation is based on BCWP-ACWP and the level is most often dictated by the charge number level where ACWP is collected. While it is recommended ACWP be collected at the WP level, it is not required.
 - c. Schedule variance is based on BCWP-BCWS, and should be calculated down to the lowest level possible, where BCWS and BCWP are determined to pinpoint the root cause of a variance.
 - d. Document all discrepancies as compliance concerns.

Interview Questions

1. CAM: Describe how you analyze cost and schedule variances by element of cost, e.g., labor, material, etc.

22.A.5 Are BCWP calculations consistent with the manner in which the work is planned?

Discussion

To ensure cost and schedule variances are accurate, the EVT used to derive BCWP must be consistent with the method used to plan and resource the associated work (See Guidelines 10 and 12.). In simple terms, that means that the CAM must use the same method when claiming performance.

A simple example would be a WP having the scope to build a concrete wall which is scheduled to take 4 months to complete. The steps include site prep, building the forms, pouring the concrete and removing the forms. Planning the work over 4 months lends

itself to the milestone method which allows progress to be measured every month. When claiming performance at the end of the month, the CAM should determine if all work that defines the milestone was completed. If yes, then the milestone is claimed.

If the percent complete methodology had been used to plan, the CAM should have established and documented quantifiable back up data (QBD) for objective work measurement. This is typically done in a spreadsheet, although any method is acceptable as long as it is documented and followed consistently. At the end of the month, the CAM evaluates work status and updates the QBD to determine BCWP.

If a 50/50 EVT were selected, progress (BCWP) could only be claimed when the effort started and when it was completed. This would not provide the ability to claim BCWP during the interim monthly reporting cycles while ACWP was still being reported. It is important to select an EVT that reflects the way the work is planned in order to accurately report progress and avoid the creation of artificial variances.

There are two principles that guide BCWP calculations:

1. Care must be taken to select the appropriate EVM measurement technique (EVT) when planning the control account or WP. The intent is that the resulting BCWP determinations objectively reflect true work performance.
2. The established methodology must be followed consistently to claim performance, i.e., the technique may not be changed midstream in an open WP, even it results in better performance data.

Impact of Noncompliance

Analysis based on variances generated from improperly planned earned value results in inaccurate performance measurement information and the resulting lack of management insight.

Verification Steps

Data Analysis (Automatable)

1. $X = \#$ of in-progress and completed WP with 0-100 EVT that do not have 0% or 100% performance/ $Y =$ Total # of in-progress and completed WP with 0-100 EVT.
Pass: $X/Y = 0$
Fail: $X/Y > 0$
2. $X = \#$ of in-progress and completed WP with 50-50 EVT WPs that do not have 50% or 100% performance/ $Y =$ Total # of in-progress and completed WP with 50-50 EVT.

Pass: $X/Y = 0$

Fail: $X/Y > 0$

Artifact Traces between Documents

1. In the IMS, confirm that the performance of WPs with EVT's of Physical % Complete correlate to the Quantifiable Backup Data (QBD), if available.
 - a. Choose 10 WPs and verify the Physical % Complete values for the period correlate to the performance measurement noted in the QBD.
 - b. QBDs can be accomplished in any order as long as it is a logical order
 - c. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: How do you know which EVM measurement technique is best when planning your CAs?
2. CAM: Demonstrate how you claim performance on a WP that uses percent complete. Have you changed the underlying QBD once work started?

22.A.6 Where EV Flow down applies, does the prime contractor assess subcontractor EV performance data, assess the need for adjustments and maintain reconciliation for any difference in reporting in the prime EVM Cost Tool?

Discussion

The prime contractor has responsibility for the entire project work scope, including the subcontracted effort. The prime contractor assigns a CAM to manage the subcontracted effort and to ensure the subcontractor's performance is accurately reported (see guideline 2). If the CAM disagrees with a subcontractor's measurement of progress, the CAM must document the discrepancy and report progress as accurately as possible. Any differences between what the subcontractor reports to the prime as progress (BCWP), and what the CAM deems the "adjusted" BCWP value, must be documented in accordance with company guidelines.

As discussed in other QE LOIs, actual costs are not adjusted except for routine accounting adjustments or correction of errors. The prime contractor CAM may adjust BCWS, BCWP, and EAC as necessary, with justification and documentation. Fee for the subcontractor is considered a cost for the prime contractor. Therefore, the prime contractor must have WPs identified for subcontract fee, if any. These WPs need to have realistic BCWP commensurate with how the fee is earned.

Impact of Noncompliance

Without an independent assessment of subcontractor status, the overall project performance may be overstated or understated.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

None

Interview Questions

1. CAM: For subcontractors with flow down EV requirements, how do you review and integrate the subcontractor's published BCWS, BCWP and ACWP data into your company's EVM data? Have you made any adjustments, and if so, how did you document these adjustments?
2. CAM: How is the subcontract fee, if any, represented in the prime contractor EVMS, and how is performance claimed? Please show me.

22.A.7 For subcontractors without an EVM flow down requirement, does the prime contractor assess subcontractor performance based on a plan containing objective indicators for measuring subcontractor performance?

Discussion

If the subcontractor does not have an EVMS flow down, the prime contractor CAM must establish a plan with the subcontractor to objectively measure subcontractor performance. The resulting baseline will support project deliverables, while incorporating objective measurements of progress aligned to expenses billed to the prime contractor.

Objective indicators may be the subcontract statement of values, technical milestones, and periodic deliveries. However the objective indicators must be based on actual work performance and not payment considerations.

This typically takes the form of a statused schedule from the subcontractor, with pre-determined values for milestones and deliverables. The prime contractor CAM should analyze this schedule and verify performance against technical indicators and progress as indicated in technical status reports, delivery reports, and technical meetings.

Impact of Noncompliance

When the prime contractor fails to plan the subcontractor effort with objective indicators, a part of the project has inadequate information to make quality decisions about performance.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm subcontract performance correlates to subcontract documentation
 - a. If available, conduct a manual trace of the subcontract statement of values to determine if the technical milestones and/or periodic deliveries have exit criteria.
 - b. Verify subcontract performance had documented objective indicators and quantifiable back up data.
 - c. If the milestones and deliveries are noted without accompanying documentation, check with the prime to determine how status updates are completed.
 - d. All claimed performance should be documented and communicated to the prime.
 - e. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: For subcontractors without flow down EV requirements, how do you review and integrate the subcontractor's published BCWS, BCWP and ACWP, and EAC in your EVMS data?
2. CAM: How is a subcontract fee, if any, represented in the prime IMS, and how is performance claimed?

22.A.8 Are variance thresholds identified and documented in the EVM procedures?

Discussion

The contractor must establish and document internal variance thresholds in their EVM SD and/or procedures, the Project Execution Plan (PEP) and other documents that support external reporting thresholds. Typically, variance thresholds are specified in the DOE contract, e.g., +/-10% and/or a dollar threshold. Whether or not these are specified in the project documentation, the contractor's SD and processes should contain a statement to the effect that internal variance thresholds established on the project must be in sufficient detail to support any external EVM reporting. Some contractors also establish

internal variance thresholds that are applied in the event that contractual thresholds are not specified, and these may be documented in project specific directives.

Impact of Noncompliance

Failure to establish and document variance thresholds that support contractual reporting results in the inability to perform effective variance analysis for internal and DOE reporting.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the EVM SD.
 - a. Does it contain any guidance on internal variance thresholds, or are they contained in supporting processes?
 - b. Does the contractor establish specific variance thresholds in project specific directives?
 - c. Do all internal variance thresholds support contractually specified variance thresholds, i.e., at the same level or less? For example, if the contractual direction specified +/-15%, are the internal thresholds at that level or tighter, e.g., +/- 10%?
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

22.A.9 Do CAMs develop and approve the Variance Analysis and is it approved consistent with the OBS?

Discussion

Control account managers (CAMs) have the sole responsibility to plan and manage their assigned CAs, including the requirement to analyze performance and document the variance analysis in the VAR. While others, such as team members and project control analysts, may assist in this process, the CAM ultimately has the responsibility to develop the VAR.

The CAM must then initiate the approval cycle as the first approval on the VAR. The contractor must establish in written guidance the subsequent approval authorities.

This typically includes the CAM, the CAM's functional manager (as reflected on the OBS), project control analyst, and project manager.

Impact of Noncompliance

Allowing personnel other than the CAM to develop the VAR may result in poor analysis and failure to identify the root causes and develop effective corrective actions. Failure to approve the VAR by the appropriate individuals may result in poor quality VARs and management not being properly informed of ongoing issues.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the EVM SD.
 - a. Does it contain the requirement that the CAM is responsible for developing and documenting the VAR? Note: it is acceptable that others, such as the project control analyst, may be designated to assist with this process, but the CAM must be held responsible.
 - b. Does the contractor establish specific approval authorities for the VAR, including (but not limited to) the CAM, functional manager, and project manager?
 - c. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: Do you have others assist you with your VAR? How do they assist you?
2. CAM: Does your functional manager review and approve your VAR? Do you discuss the VAR and corrective actions with your manager each month (if applicable)?

Guideline 22 – Typical Artifacts Common to the QE LOIs

- Internal monthly cost and schedule performance reports
- Subcontractor EV Performance Data
- IPMR, if applicable
- CPR
- Management reports from cost EVM Cost Tool
- Material and/or labor rate/use analysis reports.

Guideline 23 - Analyze Significant Variances

Identify, at least monthly, the significant differences between both planned and actual schedule performance and planned and actual cost performance, and provide the reasons for the variances in the detail needed by program management.

Discussion

The ability to analyze deviations from the established plan permits management at all levels to rapidly and effectively implement corrective actions in an effort to regain project/contract objectives. Without this visibility into and the understanding of plan deviations, the success of the project can be jeopardized. Additionally, insight into future cost and schedule performance, based on the analysis of variances, will be facilitated. The purpose of this guideline is to ensure both significant SVs and CVs are analyzed, at least monthly, at a level of detail required to manage the effort; i.e., to enable management decision-making and corrective action.

This guideline is further broken out into subsections for clarification.

- Variance Analysis Policy Aspects
- VAR Content
- VAR Analysis

Variance Analysis Policy Aspects: What guidance is needed for variance analysis documentation?

VAR Content: What is expected to be included in a VAR?

VAR Analysis: What specifics need to be assessed in VAR analysis?

23.A Subsection - Variance Analysis Policy Aspects

The majority of accounting and budgeting systems are based on the contractor's accounting calendar. Unless another reporting period is mandated, analysis should be conducted per this same cadence. In accordance with external IPMR/CPR reporting, analysis of CVs, SVs, and variances at completion (VACs) are required to be completed (see GL 27 for more information on VACs).

Performance measurement data, by element of cost, is used to identify trends in cost, schedule, and technical performance. By using this information to determine the root causes of variances, management is better able to address specific problems, and move forward to focus on mitigation as well as cost and schedule projections. This process, like all other parts of the supplier's management system, must be documented in formal operating procedures.

In those cases where no EVMS flow down requirement exists for a major subcontractor, it is necessary for the prime to evaluate subcontractor performance. Formal procedures should document the establishment of subcontractor reporting requirements, as well as validation and review of the subcontractor's performance measurement data submissions by the prime contractor.

The guideline is defined by QE LOI defined below.

23.A.1	Is variance analysis conducted at least monthly?
23.A.2	Does the contractor: 1) Identify the root cause of cost and schedule variances exceeding the thresholds, 2) Identify the impact of the variance to the CA and total project, 3) Address mitigation or impacts of the variance and related corrective actions?
23.A.3	For subcontracts with an EVM flow down, is the prime's variance analysis for major subcontractors consistent with the documented EVM practice?

QE LOIs Repeated With Discussions

23.A.1 Is variance analysis conducted at least monthly?

Discussion

Analysis of cost and schedule variances and variances at completion are conducted at the control account level on a monthly basis. Once notified that established thresholds have been breached, the CAM is responsible to document formal variance analysis. This analysis provides an early insight into the root causes, impacts and corrective actions related to cost and schedule challenges and highlights the potential need for management action to mitigate potential or realized project risks. Analyzing variances at the control account and summary levels enables project management to understand the impact of cost and schedule performance drivers at the point where budget, scope, and resources are actively managed.

Impact of Noncompliance

Without monthly/routine data and variance analysis, management is unable to use the EVM information to make timely decisions or to properly assess project performance.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify that variance analysis is conducted every month
 - a. Review the SD and project documentation to verify the reporting frequency required.
 - b. If the requirement is monthly, use the company's report that reflects the CAs that have exceeded thresholds for a given month.
 - c. Compare the VARs in the data call to the report making sure there are

- VARs for all the thresholds that have been exceeded.
- d. Review the current period as well as the cumulative to date requirements for required variances.
 - e. $X = \#$ of threshold violations at the control account level that do not have VARs / $Y =$ total # of required VARs
 - f. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: How are you notified that your CAs have exceeded variance thresholds? How often does this occur?

23.A.2 Does the contractor: 1) Identify the root cause of cost and schedule variances exceeding the thresholds, 2) Identify the impact of the variance to the CA and total project, 3) Address mitigation or impacts of the variance and related corrective actions?

Discussion

The contractors' variance analysis process provides guidance for CAMs to determine specifically what root causes are driving the cost and schedule variances in their CAs. The basic definition of root cause in this context is the issue that if fixed would prohibit the variance from recurring.

The various reports available to CAMs provide accounting of BCWS, BCWP and ACWP by EOC in sufficient detail to allow a thorough analysis to be conducted. Some reporting systems may have a drill down capability where the CAMs are responsible for conducting much of their own investigation while others provide all the detailed information.

Once root causes are determined, the CAM identifies the impact of the variance to the CA and project, and then advises project management of corrective actions needed to mitigate the cause of the variance. These corrective actions are part of the VAR and should describe the specific action(s), whether an update to the EAC or forecast date is required, identification of the responsible person(s), and planned dates for completion.

Key aspects of this QE LOI include

- The narrative section: the narrative should identify quantitatively the cause of the variance and then identify the root cause(s). The expectation is that at least 70% of the variance exceeding the threshold is addressed. Current variances should be addressed separately from cumulative variances.
 - a. Cost variance (CV): An example is a \$100K cumulative cost variance for a labor account may be attributable to \$20K indirect rates, \$50K to widget technical problems, and \$30K to labor rate variances. Analysis discussion should also address elements of cost if significant and whether the CV will continue.
 - b. Schedule variance (SV): Analysis of schedule variance should also

address the float impact from the IMS. Schedule variance is typically a dollarized representation of schedule performance that does not provide visibility into detailed progress and accomplishment of the milestones and activities required for execution reflected in the IMS. Concurrent analysis of the integrated network schedule(s) is done to determine the status of specific activities, milestones, and critical events and to identify the factors contributing to the dollarized and time-based schedule variance.

- c. Variance at completion (VAC): Analysis should relate the impact of the ongoing cost variance to the projected VAC. (See Guideline 27 for more information.)
- Impact: This section should describe the cost and schedule impacts to the control account as well as any impact to programmatic events or other CAs. For schedule variances, the following should be described: the impact to the critical path (i.e., a delay in a critical activity's completion effects the project completion), float, schedule margin (where applicable), contractual milestones and/or delivery dates. This section should also address the impact to the Estimate to Complete (ETC).
- Corrective action: See Guideline 26.

Impact of Noncompliance

Lack of analysis of significant problems exceeding a threshold results in the inability to control project performance and can impact the integrity of the EAC.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review procedures and VARs regarding how to identify and mitigate the causes of variances.
 - a. Confirm the SD and other documentation describes the VAR process to include root cause identification, impact from the reporting level up to the project level, and corrective action identification for those CAs tripping established thresholds.
 - b. Select 10 CAs for VAR review from each of the last three reporting periods.
 - c. Verify the root cause(s) is identified for both cost and schedule variances. Schedule variances should also address the impact to the IMS.
 1. $X = \text{total \# of variances that do not address root cause} / Y = \text{total \# of VARs}$
 2. $X = \text{total \# of root causes that do not address variance/issue} / Y = \text{total \# of VARs}$

- d. Based on the root cause, confirm the impact of the variance is outlined from the CA level with roll-up to the project level, as applicable.
 - 1. $X = \text{total \# of variances that do not address impact} / Y = \text{total \# of VARs}$
- e. Verify, based on the impact, the appropriate mitigation and related corrective actions have been identified and documented.
 - 1. $X = \text{total \# of variances that do not include corrective action as applicable} / Y = \text{total \# of VARs}$
- f. Each variance analysis narrative explanation should be quantitative and addressing at least 70% of the cause of the variance.
- g. 100% should have root cause, impact, and applicable corrective actions identified
- h. Review any elements that have VARs for all three selected reporting periods. Verify that the analysis, impact statements, and corrective actions have been updated.
- i. Two or more CAMs of the ten selected have significant issues for two or more months if applicable or significant errors for a month. Significant is blaming the data, not explaining technical, restating the problem only, or ignoring trends, impacts, or corrective actions.

Interview Questions

- 1. CAM: Describe how your variance analysis includes the identification of cost and schedule impacts. How do you relate ongoing cost variances to future EAC impacts?

23.A.3 For subcontracts with an EVM flow down, is the prime's variance analysis for major subcontractors consistent with the documented EVM practice?

Discussion

Variance analysis of the subcontractor's EVM performance must be conducted regardless of whether the EVMS requirement was flowed down to the subcontractor. A subcontractor with a flow down must formally implement their EVMS management system and conduct variance analysis for any variances exceeding thresholds. These VARs are then submitted to the prime's CAM for review, concurrence and incorporation into the prime's IPMR/CPR that is subsequently reported to the DOE. If there were no flow down requirement, the responsible prime contractor CAM must analyze the subcontractor's performance using data such as technical status reports, statused schedules, formal or informal communication, etc. and then document their analysis in the VAR.

The contractor's SD and EVM processes/procedures must document the analysis process for subcontractors when EVMS requirements are flowed down or not.

Impact of Noncompliance

Without the establishment of an appropriate variance analysis process from the prime and the subcontractor, the lack of a standardized performance assessment may result in undetected deviations from the plan.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Determine if the contractor is conducting variance analysis with its subcontractors.
 - a. Review the process that addresses how subcontractors are managed (this should include both subcontractors with and without EVMS flow down)
 - b. Review the RAM to determine which CAs contain subcontracted effort and which CAs have a mix of prime resources and subcontracted effort.
 - c. Review PEP, Work statement or applicable documents to determine if there are any subcontracts having an EVMS flow down
 - d. Review the contractor's SD and EVM processes to ensure that a process has been established and documented for variance analysis of subcontractors
 - e. For subcontractors with an EVMS flow down:
 1. Determine if any CAs for the subcontracted effort have breached variance thresholds.
 2. Review the sub's IPMR/CPRs to determine if the appropriate variances have been addressed.
 3. Review the prime's IPMR/CPRs to review how the sub's VARs were incorporated.
 - f. For subcontractors without a flow down:
 1. Determine if any subcontractors have breached variance thresholds.
 2. Review the applicable VARs for the last three months to determine if the appropriate variances have been addressed by the responsible prime CAM.
 - g. Document all discrepancies as compliance concerns

Note: Be sure to use the company's report that reflects the CAs that have exceeded thresholds for the same month that applies to the VARs.

Interview Questions

1. CAM: How do you determine if your subcontractor has any cost or schedule variances and if they are outside the thresholds?

2. CAM: How do you review your subcontractor's progress or VARs and incorporate them into your own analysis?

23.B Subsection - VAR Content

Discussion

The ability to analyze significant variances allows project management to understand the impact of cost and schedule performance drivers from the point where budget, scope, and resources are planned and most actively managed. Additionally, the predictive capability gained from variance analysis provides greater insight into future cost and schedule performance and is invaluable to the success of the project.

The EVM SD and processes or project documentation must include reporting requirements. It is essential that external threshold definitions, and more stringent internal thresholds, if utilized, identify percentages with dollar value formulas specified for the types of variance calculation conducted on current, cumulative, and at completion values for schedule (time based) and cost (budget based) variances. The evaluation of variances segregated by EOC provides an opportunity to more effectively identify and target corrective actions. Process documentation must outline automation, control and maintenance of variance calculations to ensure a periodic, repeatable process.

Given the Level of Effort (LOE) parameters discussed in Guideline 12, care must be taken to avoid distortion when analyzing CAs containing both LOE and discrete effort since, by definition, the LOE component will have no schedule variance. Where LOE and discrete WPs are combined within a CA, a separate variance analyses for the discrete or apportioned effort versus the LOE elements of the CA is required. All this means is summarize the WPs that are LOE vice Apportioned Versus Discreet and analyze them separately. In addition, as with all variance analysis, the identification of variances by EOC for the LOE effort, such as management labor, low-value material, and travel, is vital for effective evaluation and mitigation of the variance.

The guideline is further defined by QE LOI shown below.

23.B.1	Are schedule and cost variances identified and analyzed at the control account level with providing relevant project information for decision making including insight into variance by element of cost?
23.B.2	Does variance analysis reporting address Current, Cumulative and At Completion Variances according to the thresholds established?

QE LOIs Repeated With Discussions

23.B.1 Are schedule and cost variances identified and analyzed at the control account level providing relevant project information for decision making including insight into variance by element of cost?

Discussion

Variance analysis is always required at the control account level. The contractor should provide lower level details to the CAM to allow analysis of cost variances by element of cost, e.g., labor, material, other direct costs, and indirect costs. This

information may be either at the control account or WP level, depending on how low the planning has been accomplished. Analysis by element of cost allows proper identification of the drivers and effective corrective action planning. For example, a labor account may have a significant cost variance, but analysis indicates that the variance is from the direct labor rates. The corrective action required to correct this trend might be to see if lower rate workers could be used. On the other hand, if the variance results from more labor hours expended than planned, then the corrective action would instead focus on correcting the issue that led to the additional hours.

Variance analysis by element of cost must also be performed for schedule variances on EVM data. This would also provide insight into which element of cost is causing the SV. This analysis should be done in conjunction with analysis of the IMS.

The variance analysis for the IMS must identify the differences between a duration variance (baseline duration – current duration) and a schedule variance (baseline finish – actual (or projected/early finish)). Duration-based variances must be addressed in terms of days/weeks/months including any float impacts. Additionally, duration based variances must be integrated with the cost/schedule variances, and considered when quantifying impact and determining the need for corrective actions. Schedule variances also need to be evaluated in terms of the cost impact.

Impact of Noncompliance

When analysis is not performed by element of cost, this impacts the ability to target emerging trends and to correctly identify root causes for mitigation.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Make sure variance analysis is conducted by element of cost.
 - a. Review the PEP to determine the levels of the WBS or OBS which require variance analysis to be conducted.
 - b. Use the company's report to confirm variances are identified at the control account level and other required levels.
 - c. Use the company's report to determine which CAs have exceeded thresholds for a given month.
 - d. Compare the VARs to the report making sure there are VARs for all the thresholds that have been exceeded.
 - e. Review the VARs to verify that analysis has been performed by element of cost.
 - f. Make sure to review the current period as well as the cumulative to date

- requirements
- g. Document all discrepancies as compliance concerns

Interview Questions

None

23.B.2 Does variance analysis reporting address Current, Cumulative and At Completion Variances according to the thresholds established?

Discussion

The CAM receives internal reports that identify SV and CV for both current period and cumulative to date, and variance at completion. The CAM must understand these different variances and be required to separately analyze and address variances in each category (current SV and CV, cum SV and CV, and VAC) that exceed the specified thresholds. The resulting VAR must clearly show separate discussions for each category. This must also be identified by WP as applicable when the VAR is documented at the control account level.

Impact of Noncompliance

Unless variance analysis includes the calculation of current, cumulative, and at completion variances, the insight into future cost and schedule performance for the entire project will be impaired.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Make sure VARs address current and cumulative to date for SV and CV, and VAC.
 - a. Use the company's report to confirm the data identifies current period, cumulative to date and at completion variances.
 - b. Use the company's report to determine which CAs have exceeded current period, cumulative to date and at completion thresholds.
 - c. Compare the VARs to the report making sure there are VARs for all the thresholds that have been exceeded.
 - d. Review the content of 10 VARs to determine if the appropriate variance(s) have been addressed.
 - e. There will be instances where a CA may have exceeded one or two of the three thresholds (current, cum, at completion) and not the others. Are all

- addressed separately as applicable?
- f. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: How do you know what types of variances should be addressed in a VAR?
2. CAM: What reports do you receive that tell you current month, cumulative, and at complete variances?

23.C Subsection - VAR Analysis

Cost variances, schedule variances, and at completion variances that exceed the internally applied and/or external established thresholds are considered significant enough to require in-depth analysis and possible management action. The contractor's EVMS must have the capability to accurately calculate and analyze labor cost variances (rate and volume) and material cost variance (price and usage). In addition to government specified reporting thresholds, the contractor will apply variance analysis thresholds consistent with internal procedures.

VAR Analysis must include an evaluation of the impact to critical or near critical activities in the IMS, given the current or cumulative SV. Using the identified root cause, the CAM must address any future impact, as well as specific cost and schedule projections. Further guidance on updates to ETC and EACs is found in Guideline 27.

The guideline is further defined by QE LOI shown below.

23.C.1	Does the contractor's schedule variance address the impact to float, critical events, schedule margin, or required delivery dates as applicable?
23.C.2	Are all cost, schedule, and technical impacts to the control account discussed?
23.C.3	Does the contractor's variance analysis narrative require addressing labor rate and volume variances as well as material price and usage variances as applicable?
23.C.4	If the contractor uses internal variance analysis thresholds different from the project thresholds, do they support the thresholds established for external reporting in the IPMR/CPR and PARSII?

QE LOIs Repeated With Discussions

23.C.1 Does the contractor's schedule variance address the impact to float, critical events, schedule margin, or required delivery dates as applicable?

Discussion

When activities in the schedule are networked to support important project events such as critical decision points, deliverables and significant technical reviews, the use of this network ensures the project planning is aligned with project objectives and deliverables. When activities slip, the schedule network reflects any impacts to the significant event being supported. For the analysis of a schedule variance to be complete, impacts to these significant events must be addressed. If a schedule variance results in a change to the end deliverable on the project, and schedule margin is being used, the variance narrative should include the net impact to the schedule margin. Since schedule margin is held at the project level, the CAM may not be able to quantify the full effect on the schedule margin changes to include other CAs, but the Project Manager must summarize this information at the project level as reported in the IPMR/CPR Format 5.

Impact of Noncompliance

Without visibility into the impacts of the variances, management will not be able to effectively prioritize corrective actions.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Make sure variance impacts address significant project events.
 - a. Review the statused schedule to determine if any significant project events, milestones, and/or deliverables have slipped since the previous monthly status update.
 - b. If schedule margin is utilized, determine if the schedule margin duration has decreased after the last monthly status update.
 - c. Focus on those items that have slipped and trace the predecessors back to the activities in the schedule.
 - d. Identify the CAs that contain those identified activities.
 - e. Review the monthly EVMS report that identifies which CAs have breached a schedule variance threshold for the current period or cum-to-date.
 - f. Match the CAs requiring VARs to the activities previously identified
 - g. Review the impact section of the VARs to determine if any significant project events, milestones, deliverables or schedule margin have been addressed.
 - h. The VAR does not need to address all significant event or deliverables, just the ones impacting the schedule.
 - i. There may be more than one predecessor to a significant event and the amount of float may determine which activity actually impacted the successor.
 - j. The schedule margin activity may have many predecessors and the evaluation of total float values for predecessor activities will play a role in determining which activities are responsible for the decrease in the Schedule Margin duration.
 - k. For predecessors with the least amount of float, the VAR should address the impact to their successors.
 - l. The data reporting between the VARs, IMS (IPMR/CPR Format 6) and IPMR/CPR Format 5 should correlate.
 - m. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: How do you know if your activities impact other activities in the project?

23.C.2 Are all cost, schedule, and technical impacts to the control account discussed?

Discussion

By conducting cost and schedule variance analysis for the current period, short term cost, schedule and technical impacts are evaluated. With cumulative and at completion variances, the long term effect on deliverables or other significant events from the CA to the Project level are quantified and assessed.

A key part of this QE LOI is technical impacts. Technical problems typically are early warning indications of pending schedule and cost impacts. Therefore the discussion of technical challenges or successes is required to be discussed in the variance analysis at the control account level.

Impact of Noncompliance

Without visibility into the impacts of the variances, management is not able to effectively prioritize corrective actions.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review information for the last 3 months and verify the content below.
Part A: Long term schedule impacts
 - a. Review the statused schedule to determine if any significant project events, milestones, deliverables have slipped after the last monthly status update.
 - b. If schedule margin is utilized, determine if the schedule margin duration has decreased after the last monthly status update.
 - c. Focus on those items that have slipped and trace the predecessors back to the activities in the schedule.
 - d. Identify the CAs that contain those identified activities.
 - e. Review the monthly EVMS report that identifies which CAs have breached a schedule variance threshold for the current period or cum-to-date.
 - f. Match the CAs requiring VARs to the activities previously identified.
 - g. Review the impact section of the VARs to determine if any significant project events, milestones, deliverables or schedule margin have been addressed.
 - h. Confirm any long term schedule impact of the VAR at the WBS summaries and the project level.

2. Part B: Short term schedule impacts
 - a. Review the impact section of the VAR to determine if any other activities in the same CA or the next successor in the schedule network have been addressed.
 - b. Confirm that the VAR addresses any short term schedule impacts of the variance at the WBS summaries and the project level.
3. Part C: Technical impacts
 - a. Review the impact section of the VAR to determine that there is a discussion regarding the technical aspects of the variance.
 - b. Technical status is a strong indicator of cost and schedule variance and must be monitored closely in terms of trends in variance analysis.
 - c. Compare the technical discussion to the project's risk register to determine if they correlate.
4. Part D: Cost impacts
 - a. Review the monthly EVMS report that identifies which CAs have breached a cost variance threshold for the current period or cum-to-date.
 - b. Review the impact section of the VARs to determine that any cost impacts have been addressed.
 - c. Confirm any cost impact of the VAR at the WBS summaries and the project level.
 - d. The data analysis should correlate between the technical, and cost and schedule, resulting in no inconsistencies.

Interview Questions

1. CAM: How do you determine or find out if you have created any cost, schedule, and/or technical impacts at the summary levels of the project?

23.C.3 Does the contractor's variance analysis narrative require addressing labor rate and volume variances as well as material price and usage variances as applicable?

Discussion

Labor: It is important for the CAM to determine if a contributor to a cost variance for labor is related to a rate or volume variance. Volume (usage) variances mean that the scope of work required more or less hours than planned, while rate variances mean the labor mix that was used was more or less expensive than planned. Accounting reports generally provide the information needed to determine which elements are causing the variance. Mathematically, rate (price) and volume (usage) variances equal the total cost variance. So this requirement is simply to break the cost variance into logical components.

This detailed knowledge will help the CAM determine the proper corrective actions get back on cost and/or schedule and to reduce or eliminate the variance.

For example let's assume a labor variance. If the variance is because of volume then why were more hours required? Was there a technical problem? If the variance is because of labor rates there could be two possible explanations. The actual labor rate was different than the budgeted rate, or alternatively, a different class of labor was used, resulting in a different labor rate.

Material: The CAM for material CAs should also isolate the difference between material price and usage variances. A price variance means that the actual unit cost varied from the budgeted unit cost, while a usage variance means that the quantity of items consumed varied from the budgeted quantity. The contractor must provide material cost reports to the CAM that provide the information necessary to calculate these variances.

It can be seen by the nature of the Rate/Volume or Price/Usage variances, the root cause, impacts and corrective action are logically very different. This detailed knowledge helps the CAM determine the proper corrective actions to get back on cost and/or schedule and reduce or eliminate the variance.

Labor cost variances require analysis relative to rate and volume variances:

$$\text{Rate Variance} = (\text{Budgeted Rate} - \text{Actual Rate}) \times \text{Actual Hours}$$

$$\text{Volume Variance} = (\text{Budgeted Hours} - \text{Actual hours}) \times \text{Budgeted Rate}$$

$$\text{Rate Variance} + \text{Volume Variance} = \text{Labor Cost Variance}$$

Material cost variances require analysis relative to price and usage variances:

$$\text{Price Variance} = (\text{Budgeted Unit Price} - \text{Actual Unit Price}) \times \text{Actual Quantity.}$$

$$\text{Usage Variance} = (\text{Budgeted Quantity} - \text{Actual Quantity}) \times \text{Budgeted Unit Price.}$$

$$\text{Price Variance} + \text{Usage Variance} = \text{Material Cost Variance}$$

Impact of Noncompliance

Without recognizing rate vs volume labor variances and/or price vs usage material variances, there is limited visibility if the variance is caused by using more of the resources than planned or the resources cost more than planned.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Determine if VARs provide labor rate vs volume and/or material price vs usage

information.

- a. Review the SD and EVM processes to confirm the monthly VAR process requires differentiation between labor and material variance analysis.
- b. Review the monthly EVMS report that identifies which CAs have breached cost or schedule variance thresholds for the current period or cumulative to date.
- c. Review the cause sections of the VARs addressing labor variances to determine if the cause is a rate issue and/or a volume (usage) issue. Verify the delta between the planned rates and actual rates and/or the planned resource usage and actual resource usage, to confirm the root cause of the variance. Confirm that this was explained in the narrative if warranted.
- d. $\text{Rate Variance} = (\text{Budgeted Rate} - \text{Actual Rate}) \times \text{Actual Hours}$
- e. $\text{Volume Variance} = (\text{Budgeted Hours} - \text{Actual hours}) \times \text{Budgeted Rate}$
- f. $\text{Rate Variance} + \text{Volume Variance} = \text{Labor Cost Variance}$
- g. Review the cause sections of the VARs addressing material variances to determine if the cause is a difference in budgeted and actual price and/or the difference in planned usage versus actual usage to confirm the root cause of the variance. Confirm that this was explained in the narrative.
- h. $\text{Price Variance} = (\text{Budgeted Unit Price} - \text{Actual Unit Price}) \times \text{Actual Quantity}$.
- i. $\text{Usage Variance} = (\text{Budgeted Quantity} - \text{Actual Quantity}) \times \text{Budgeted Unit Price}$.
- j. $\text{Price Variance} + \text{Usage Variance} = \text{Material Cost Variance}$
- k. In order to best identify the root cause and impact, VARs must incorporate rate/price versus volume/usage for labor and material where significant.
- l. Document all discrepancies as compliance concerns

Interview Questions

None

23.C.4 If the contractor uses internal variance analysis thresholds different from the project thresholds, do they support the thresholds established for external reporting in the IPMR/CPR and PARSII?

Discussion

Reporting thresholds are determined by first considering the impact to the project. Tighter thresholds may be established for areas of high risk or significant events or deliverables that the project cannot allow to result in schedule delays or cost overruns. Internal thresholds may be established by the contractor to help them maintain a tighter control on the project and stay within the contractual thresholds. Risks recognized by the contractor may also warrant tighter internal thresholds.

Thresholds (typically a percentage) are normally established for CVs and SVs for both current period and cumulative to date and VACs (at completion variances). Thresholds typically are both plus and minus, meaning the variance could be positive or

negative and if it breached either the plus side or minus side of the threshold, a variance analysis report would be required. Additionally, a dollar threshold is established and may be stipulated as “and” if the dollar value is an added condition that must be met to breach the percentage reporting threshold. Alternately, the dollar threshold may be stipulated as “or” if the dollar threshold could cause a breach regardless of the percentage reporting threshold. A typical “and” set of variance thresholds might look like this:

	Current Period	Cumulative to Date	At Completion
CV	+ or - 15% and \$50K	+ or - 10% and \$100K	+ or - 10% and \$100K
SV	+ or - 15% and \$50K	+ or - 10% and \$100K	+ or - 10% and \$100K

Impact of Noncompliance

Internal thresholds that do not support external ones hinder project success.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Determine if internal variance thresholds are appropriate
 - a. Review the PARSII or external thresholds if any.
 - b. Review the internal variance analysis thresholds.
 - c. Confirm internal thresholds are equal or tighter (more VARs) than the external requirement. Given the requirement for variance analysis to be run at the CA level at a minimum, the internal thresholds will be tighter than the external requirements.
 - d. Document all discrepancies as compliance concerns.

Interview Questions

None

Guideline 23 – Typical Artifacts Common to the QE LOIs

- Internal monthly cost and schedule performance/variance reports
- Integrated Project Management Report (IPMR), if applicable
- Contract Performance Report (CPR)
- Management reports from EVM Cost Tool
- Project Integrated Master Schedule (IMS)
- CAPs

Guideline 24 - Analyze Indirect Cost Variances

Identify budgeted and applied (or actual) indirect costs at the level and frequency needed by management for effective control, along with the reasons for any significant variances.

Guideline 24 and the related QE LOIs are discussed in Section 7.0. This guideline along with guidelines 4, 13, and 19 are described as a whole in Section 7.0 Indirect Guidelines.

Guideline 25 - Summarize Performance Data and Variances for Management Reporting

Summarize the data elements and associated variances through the program organization and/or work breakdown structure to support management needs and any customer reporting specified in the project.

This Guideline requirement stipulates EVMS data used for internal management reporting and external customer reporting emanates from the same source, ensuring both the contractor and the Government are using the same database to manage the project. All the data elements (BCWS, BCWP, and ACWP) are calculated at the CA level and must summarize from the CA level up through the through the Work Breakdown Structure (WBS) and across the Organizational Breakdown Structure (OBS) to the total contract level without being divided among two or more higher level WBS elements. The success of the summarization process promotes accurate management insight as well as budget integrity and reconciliation. Variance thresholds internal to the Contractor, if specified, may be tighter than the thresholds identified for external reporting.

The guideline is further defined by QE LOI shown below.

25.A.1	Is performance measurement information summarized from the control account to the project level through WBS and OBS for project management analysis purposes?
25.A.2	Is performance data reported in internal reports consistent with data contained in external reporting or reconciled?
25.A.3	Deleted

QE LOIs Repeated With Discussions

25.A.1 Is performance measurement information summarized from the control account to the project level through WBS and OBS for project management analysis purposes?

Discussion

Projects are structured using a WBS and OBS which define the CAs. These subdivisions of the WBS and OBS ensure an understanding of responsibility for managing and controlling the allocation of resources to the work scope. The WBS and OBS also serve as the structure for summarizing cost accumulation and reporting performance measurement data to ensure to correct scope is aligned with the correct EVMS data are provided to the appropriate responsible person. Summary level variance analysis requirements vary, depending on project requirements. If summary level variance analysis is required, the summary level managers or Project Managers have the same responsibility as CAMs have, just at a higher level in the WBS or OBS. While a summary level manager may rely on CAMs to provide the detailed variance analysis applicable to their CAs, they should be cognizant of the cost and schedule performance for their area of their responsibility.

Impact of Noncompliance

Inconsistent analysis between the CAM level and the project level masks performance and increases project costs.

Verification Steps

Data Analysis (Automatable)

1. X = Count of occurrences where WBS Levels (Format 1 total $BCWS_{cur}$ - (sum (all $BCWS_{cur}$ from EVM Cost Tool))) does not equal zero, for every level of the WBS/ Y = Total # of WBS Elements in Format 1
Pass: $X/Y = 0$
Fail: $X/Y > 0$
2. X = Count of occurrences where WBS Levels (Format 1 total $BCWS_{cum}$ - (sum (all $BCWS_{cum}$ from EVM Cost Tool))) does not equal zero, for every level of the WBS/ Y = Total # of WBS Elements in Format 1
Pass: $X/Y = 0$
Fail: $X/Y > 0$
3. X = Count of occurrences where WBS Levels (Format 1 total $BCWP_{cur}$ - (sum (all $BCWP_{cur}$ from EVM Cost Tool))) does not equal zero, for every level of the WBS/ Y = Total # of WBS Elements in Format 1
Pass: $X/Y = 0$
Fail: $X/Y > 0$
4. X = # of occurrences where WBS Levels (Format 1 total $BCWP_{cum}$ - (sum (all $BCWP_{cum}$ from EVM Cost Tool))) does not equal zero, for every level of the WBS/ Y = Total # of WBS Elements in Format 1
Pass: $X/Y = 0$
Fail: $X/Y > 0$
5. X = Count of occurrences where WBS Levels (Format 1 total $ACWP_{cur}$ - (sum (all $ACWP_{cur}$ from EVM Cost Tool))) does not equal zero, for every level of the WBS/ Y = Total # of WBS Elements in Format 1

Pass: $X/Y = 0$
Fail: $X/Y > 0$
6. X = Count of occurrences where WBS Levels (Format 1 $ACWP_{cum}$ - (sum (all $ACWP_{cum}$ from EVM Cost Tool))) does not equal zero, for every level of the WBS/ Y = Total # of WBS Elements in Format 1
Pass: $X/Y = 0$
Fail: $X/Y > 0$
7. X = Count of occurrences where WBS Levels (Format 1 total BAC - (sum (all

BAC from EVM Cost Tool))) does not equal zero, for every level of the WBS/Y = Total # of WBS Elements in Format 1

Pass: $X/Y = 0$

Fail: $X/Y > 0$

8. X = Count of occurrences where WBS Levels (Format 1 total EAC - (sum (all EAC from EVM Cost Tool))) does not equal zero, for every level of the WBS/Y = Total # of WBS Elements in Format 1

Pass: $X/Y = 0$

Fail: $X/Y > 0$

9. X = Count of occurrences where OBS Levels (Format 2 total $BCWS_{cur}$ - (sum (all $BCWS_{cur}$ from EVM Cost Tool))) does not equal zero, for every level of the OBS / Y = Total # of OBS Elements in Format 2 or EVM Cost Tool Data

Pass: $X/Y = 0$

Fail: $X/Y > 0$

10. X = Count of occurrences where OBS Levels (Format 2 total $BCWS_{cum}$ - (sum (all $BCWS_{cum}$ from EVM Cost Tool))) does not equal zero, for every level of the OBS / Y = Total # of OBS Elements in Format 2 or EVM Cost Tool Data

Pass: $X/Y = 0$

Fail: $X/Y > 0$

11. X = Count of occurrences where OBS Levels (Format 2 total $BCWP_{cur}$ - (sum (all $BCWP_{cur}$ from EVM Cost Tool))) does not equal zero, for every level of the OBS / Y = Total # of OBS Elements in Format 2 or EVM Cost Tool Data

Pass: $X/Y = 0$

Fail: $X/Y > 0$

12. X = Count of occurrences where OBS Levels (Format 2 total $BCWP_{cum}$ - (sum (all $BCWP_{cum}$ from EVM Cost Tool))) does not equal zero, for every level of the OBS / Y = Total # of OBS Elements in Format 2 or EVM Cost Tool Data

Pass: $X/Y = 0$

Fail: $X/Y > 0$

13. X = Count of occurrences where OBS Levels (Format 2 total $ACWP_{cur}$ - (sum (all $ACWP_{cur}$ from EVM Cost Tool))) does not equal zero, for every level of the OBS / Y = Total # of OBS Elements in Format 2 or EVM Cost Tool Data

Pass: $X/Y = 0$

Fail: $X/Y > 0$

14. X = Count of occurrences where OBS Levels (Format 2 total $ACWP_{cum}$ - (sum (all $ACWP_{cum}$ from EVM Cost Tool))) does not equal zero, for every level of the OBS / Y = Total # of OBS Elements in Format 2 or EVM Cost Tool Data

Pass: $X/Y = 0$

Fail: $X/Y > 0$

15. X = Count of occurrences where OBS Levels (Format 2 total BAC - (sum (all

BAC from EVM Cost Tool))) does not equal zero, for every level of the OBS / Y
= Total # of OBS Elements in Format 2 or EVM Cost Tool Data
Pass: $X/Y = 0$
Fail: $X/Y > 0$

16. X = Count of occurrences where OBS Levels (Format 2 total EAC - (sum (all EAC_{cum} from EVM Cost Tool))) does not equal zero, for every level of the OBS /
Y = Total # of OBS Elements in Format 2 or EVM Cost Tool Data
Pass: $X/Y = 0$
Fail: $X/Y > 0$

Artifact Traces between Documents

None

Interview Questions

None

25.A.2 Is performance data reported in internal reports consistent with data contained in external reporting or reconciled?

Discussion

In a compliant implementation, there is only one set of data. Project management must have the same goals, objectives, and deliverables as DOE has placed on the contract. This alignment allows everyone to progress through project execution with the same plans and expectations.

Impact of Noncompliance

The contractor's execution plans are not aligned with the contractual goals and deliverables.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the data elements in the EVM Cost Tool and the variance analysis correlates to the IPMR/CPR Format 1 and 5.
 - a. Confirm the EVM Cost Tool values match the IPMR/CPR Format 1 for current and cumulative BCWS, BCWP, and ACWP, plus BAC and EAC. Confirm this at the bottom summary level, and perform 10 spot checks on WBS elements at different levels.
 - b. Confirm the value of MR and UB on the IPMR/CPR Format 1 with the values

- shown in the CBB log.
- c. Confirm the EVM Cost Tool values match the IPMR/CPR Format 2 for current and cumulative BCWS, BCWP, and ACWP, plus BAC and EAC. Confirm this at the bottom summary level, and perform 10 spot checks on OBS elements at different levels.
 - d. Confirm the value of MR and UB on the IPMR/CPR Format 1 with the values shown in the CBB log.
 - e. Compare variance value (current/cumulative) from IPMR/CPR Format 1 to Format 5 to confirm if the correct variances are addressed in Format 5.
 - f. Review Format 5 explanations to verify the explanations reflect the information from the CA level VARs.
 - g. Document all discrepancies as compliance concerns

Interview Questions

None

Guideline 25 – Typical Artifacts Common to the QE LOIs

- Internal Performance Reports
- Project Organizational Chart (to include functional management when applicable)/OBS
- Integrated Project Management Report (IPMR), if applicable
- Contract Performance Report (CPR)
- Management reports from EVM Cost Tool

Guideline 26 - Implement Corrective Actions

Implement managerial action taken as the result of earned value information.

Discussion

The availability of timely and accurate EVM data for variance analysis provides management early insight into the magnitude of potential problems. Subsequent management response, by all levels, is required to mitigate the impacts on project objectives.

As a result of routine performance data evaluation, the project's internal reports and reports forwarded to their customer must indicate the overall technical, schedule and cost impacts of such problems on the project. For effective management control, root cause analysis, impacts, and resulting corrective actions are identified at the appropriate level and then formally tracked to resolution and closure. As appropriate, functional managers who may have overall control over the resource pool may also need to concur with the corrective action.

The guideline is further defined by QE LOI shown below.

26.A.1	Is there evidence the contractor's management uses and analyzes earned value information (at least on a monthly basis) as a part of their decision-making?
26.A.2	Do corrective actions identify risk mitigation steps, including activities to reduce cost/schedule impacts, a completion schedule and persons responsible for executing the corrective action plans?
26.A.3	Are corrective action plans that are generated through the variance analysis process tracked to their resolution and closure?
26.A.4	Are corrective actions and any trend analysis explanations oriented toward mitigation/forecasting of the EAC and estimated completion date impacts or elimination of the variance?
26.A.5	Does the contractor's monthly cycle allow the CAM adequate time during the variance analysis process to conduct the analysis and develop reasonable corrective action plans?
26.A.6	Does the prime contractor monitor subcontractor corrective action(s) through closure?

QE LOIs are repeated below.

26.A.1 Is there evidence the contractor's management uses and analyzes earned value information (at least on a monthly basis) as a part of their decision-making?

Discussion

Sound project management embraces a consistent and repeatable process that involves monitoring the project, addressing problems and implementing and following up

on effective corrective actions until closure. Implementing corrective actions and assessing the effect is critical to ensuring the success of the project. The project maintains a monthly cadence or EVMS cycle that uses performance measurement data to manage issues that arise during execution. This monthly rhythm lends itself to reviewing the earned value data, finding variances, determining root causes and the appropriate corrective actions and tracking these actions to closure through a corrective action log. Typically, project managers conduct status meetings, critical path meetings, and risk meetings, all using information from their EVMS. Earned value information must also be incorporated into project management reviews with internal manager and the customer.

This QE LOI also focuses on the use of EVM information in the decision-making of corporate leadership.

Impact of Noncompliance

If project management does not use the EVM data to manage the project, the result may be projects with poor cost and schedule performance.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Ask for and review the contractor's monthly EVM Business Rhythm calendar to determine if the contractor is using EVM data to help manage the project.
2. Review 5 of the CAs with significant VARs and compare the VAR corrective actions with those noted on the project corrective action plans and corrective action log (if used).
3. Document all discrepancies as compliance concerns.

Interview Questions

1. Project Manager: Given the weekly cadence, how often are corrective action plans and implementation reviewed and monitored by the team?
2. Project Manager: Can you demonstrate the review and use of earned value information at senior management levels?
3. Senior Leader: What EVM reports do you receive and at what level? How do you use this information?

26.A.2 Do corrective actions identify risk mitigation steps, including activities to reduce cost/schedule impacts, a completion schedule and persons responsible for executing the corrective action plans?

Discussion

Once corrective action plans are developed, they are documented in the VAR. These plans should identify specific actions that are required, risk mitigation steps, whether or not there is a risk impact, a completion schedule, and identification of the responsible person(s). The plans are documented, implemented, and monitored until resolution of the problem. An effective project management approach should ensure that the individuals responsible for implementing corrective actions have sufficient authority and control over the required resources used to resolve or recover from the performance deviation. Identified cost, schedule and technical risks should be incorporated into a formal risk management process.

If variances are unrecoverable, an explanation of the impact on the project should be provided. If corrective action is not taken, then explain how the impact will not adversely affect accomplishment of project objectives.

While there is no requirement for a corrective action log in the guidelines, it is considered a best practice. If a log is used, the corrective actions must be captured in the log reflecting the problem/cause, the corrective action, the responsible person, estimated completion date and the actual completion date.

Impact of Noncompliance

Unless corrective actions are identified, scheduled, and assigned to a responsible person, corrective actions and risk mitigation efforts may fail to be implemented.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Select three IPMR/CPR reports and review the Format 5 variance analysis along with the VAR for the same control account.
 - a. Does the corrective action section in either document list specific actions, risk mitigation or impact, completion dates, and responsible person(s)?
 - b. Review three reporting elements that have VARs in at least two reports. Has the corrective action section been updated in the latest report?
2. Conduct a manual trace of the Corrective Action Log to ensure it is traceable and integrated with the risk management plan.
 - a. Verify the log reflects the VARs in terms of reporting period, responsible

person, and identified corrective action.

b. Check to see if corrective action log items are integrated with the risk management plan.

c. Confirm the log contains the CA or WBS level, description of the corrective action, type of variance and month of inception, responsible person, any schedule coding related to the corrective action, and expected actual completion date. It should be updated when actually closed.

d. Verify corrective action addresses cost and schedule impact mitigation or forecasting impact.

e. Document all discrepancies as compliance concerns

Interview Questions

None

26.A.3 Are corrective action plans that are generated through the variance analysis process tracked to their resolution and closure?

Discussion

Variance analysis reports are required when the control account reaches a variance threshold. Part of the VAR is documenting corrective action plans to reduce or mitigate the variance. The VAR corrective action must identify the activities, responsible person for implementation, and the estimated completion date. A corrective actions log is a best practice that documents and facilitates follow up on the actions through completion (see QE LOI 26.A.2).

Impact of Noncompliance

Without tracking to closure, corrective actions plans may not be completed and the results of corrective actions are unknown.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. If log is used by the contractor, confirm the Corrective Action Log is up to date.
 - a. $X = \# \text{ of Corrective Actions with estimated completion dates} < \text{time now} / Y$
 $= \text{Total } \# \text{ of Corrective Actions}$
 - b. Document all discrepancies as compliance concerns
2. Conduct a manual trace to confirm corrective actions identified in the Format 5 are included in the Corrective Action Log (if used).

- a. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: Please walk through a corrective action plan, to include schedules, validation, and implementation of corrective action.

26.A.4 Are corrective actions and any trend analysis explanations oriented toward mitigation/forecasting of the EAC and estimated completion date impacts or elimination of the variance?

Discussion

The focus of analysis and corrective actions is to analyze the root cause, determine how to best correct or mitigate a cost or schedule variance and forecast the EAC for cost impacts and estimated completion dates (ECDs) for schedule impacts. It may also address fixing errors or workaround plans to recover the variance. Schedule and cost impacts may warrant separate corrective actions. The focus of corrective action is either mitigation of the effect or to forecast the impact to the EAC. The corrective action should always address the root cause(s) of the variances.

Impact of Noncompliance

Without focusing corrective actions toward mitigation, the intended purpose of the corrective action may not be accomplished.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm VAR Analysis relies on the predictive capability of the EVMS to evaluate the impact of the variance in terms of underlying causes of performance discrepancies, other potential factors to consider, and any schedule delays.
 - a. For 10 CAs with a current or cumulative CV and/or SV, or a VAC, verify the root cause and impact clearly and effectively explains the reason for the variance, and the corrective action addresses the larger issue of how to mitigate future variances.
 - b. For any identified CV, make sure the corrective action addresses the mitigation of future cost growth or includes a task to update the EAC as necessary.

- c. For any identified SV, make sure the impact addresses the schedule, including the critical path, the ECD, and the quantification of any EAC impact.
- d. Review all VARs in the latest IPMR/CPR to ensure that the corrective action directly relates to the root cause(s) description.
- e. Review any VARs in the latest IPMR/CPR without a corrective action plan. These should be limited and include an explanation stating “why” no corrective action is required or possible.
- f. Document all discrepancies as compliance concerns

Interview Questions

1. Material CAM: Please explain the planning and process to avoid variances because of discrepancies in material timing.

26.A.5 Does the contractor's monthly cycle allow the CAM adequate time during the variance analysis process to conduct the analysis and develop reasonable corrective action plans?

Discussion

To best manage the work scope in their CAs, CAMs need time to review and understand performance measurement information. This includes working with their support personnel regarding the cost or schedule issues as well as the performing organizations for more details if necessary. Projects typically follow a monthly routine which specifies when particular activities such as progress assessment, EVMS report publishing, VARS, schedule meetings, etc. are planned to occur. This monthly routine is expected allow sufficient time for the various activities to be conducted.

For example the schedule may be available on the 1st of the month and actuals by the 8th. If variance analysis reports are due the 9th this would not provide adequate time for the CAMs to understand their variances and develop corrective actions. The CAMs must be given a reasonable amount of time inclusive of internal management reviews to be able to focus adequately on the variance analysis. This time period would start with the availability of IMS/Cost reports with final BCWS, BCWP, and ACWP for the current reporting month.

Impact of Noncompliance

Unless there is sufficient time to develop corrective actions, effective mitigation is compromised

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm the monthly EVMS process and/or calendar is documented.
 - a. Verify documentation exists to outline the monthly or reporting period cadence.
 - b. Review the project monthly calendar to determine if routine EVMS actions are identified.
 - c. Examples of EVMS actions are: monthly status meetings or when the status is due, actual costs from accounting due, estimated actuals due, accounting month-end close date, internal EVMS reports published, VARs distributed, completed VARs due, VARs reviewed by project management, Format 5 developed, corrective action log updated, and the IPMR/CPR submittal to the customer.
 - d. The contractor may use an EVMS process rather than a calendar; either format is acceptable.
 - e. Determine if sufficient time is allowed between the time the CAMs obtain the internal reports, receive the VARs and submit the completed VARs.
 - f. The documented process and timing must be confirmed, with sufficient time allotted for VAR preparation.
 - g. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: Do you have a schedule or monthly calendar you follow for EVMS related actions?
2. CAM: Is the time scheduled for completing VARs for your CAs adequate?
3. CAM: How does this timing fit with the monthly cadence for completing VARs and reviewing impacts and corrective actions?

26.A.6 Does the prime contractor monitor subcontractor corrective action(s) through closure?

Discussion

The requirement for EVM may be flowed down to subcontractors based on established DOE policy or an identified critical need. Regardless of whether EVM is flowed down as a requirement to the subcontractor, it is the responsibility of the prime contractor to monitor the subcontractor's performance. Therefore, the prime must track subcontractor corrective actions in the prime's corrective action system. With an EVM flow down, the prime may coordinate with the subcontractor's variance analysis process. The

subcontractor's corrective action system must include the prime CAM as the responsible person for verification of the subcontractor work.

Without a flow down, the prime contractor develops and tracks the corrective actions for the subcontractor from data solely developed by their own EVM data. Regardless of the source, the prime's corrective action system must be maintained through closure for all corrective actions on the project.

Impact of Noncompliance

If the prime has not reviewed and approved subcontractors' corrective actions, the lack of oversight may have adverse impacts on the successful performance of the project.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Conduct a manual review of the prime's corrective action log for subcontract action items.
 - a. Review the corrective action log to ensure subcontracted actions are included in the log and tracked to closure.
 - b. Compare the log to the prime IMS to determine if applicable corrective action for the subcontract effort is included and coded in the prime IMS.
 - c. Document all discrepancies as compliance concerns

Interview Questions

1. CAM responsible for managing subcontractor with EVM flow down: How do you review the sub's corrective actions? How do you monitor and track these to completion?
2. CAM responsible for managing subcontractor without EVM flow down: How do you generate and track corrective actions for the subcontractor? How do you monitor their progress and track these to completion?

Guideline 26 – Typical Artifacts Common to the QE LOIs

- Internal Reports such as management action plans, review briefings, risk register, and corrective action tracking log
- Project EVMS monthly calendar
- WADs
- IPMR, if applicable
- Project IMS

Guideline 27- Maintain Estimate at Completion

Develop revised estimates of cost at completion based on performance to date, commitment values for material, and estimates of future conditions. Compare this information with the performance measurement baseline to identify variances at completion important to company management and any applicable customer reporting requirements including statements of funding requirements.

This guideline is further broken out into subsections for clarification.

- EAC Process or General Expectations
- CAM monthly EAC Review
- Project Manager/Total Project Monthly EAC
- Comprehensive EACs

EAC Process or General Expectations: What guidance documentation is needed for EACs?

CAM monthly EAC Review: What are the CAMs' EAC responsibilities?

Project Manager/Total Project Monthly EAC: How does project management evaluate EACs?

Comprehensive EACs: What are the expectations for Comprehensive EACs?

27.A Subsection - EAC Process or General Expectations

Developing the Estimate at Completion (EAC) is a crucial part of the project management plan as it provides insight into future resource requirements. The EAC is based on the Actual Cost of Work Performed (ACWP) to date plus the ETC for the remaining incomplete work. EACs are not constrained by funding or negotiated contract costs, but focus on the total projected cost of the project work scope.

The Estimate to Complete (ETC) is developed by element of cost at the WP, planning package and Summary Level Planning Package (SLPP) levels (or lower depending on where resources are identified) for the remaining effort and are added to the cumulative ACWP to calculate the EAC. This includes evaluating the type and quantity of resources required to complete project objectives. At a minimum, direct costs are collected at the control account level so the calculation of ETCs is based on time-phased resources corresponding to the scheduled forecast dates, and is accurately summarized through the WBS and the OBS. On a monthly basis, the CAMs review the status of the expended effort and the viability of the forecast. Subcontractor EACs are included in the prime EAC. Judicious maintenance of the CA level EAC by the CAM ensures that the EAC reflects a valid projection of project costs. When updates are made to existing forecasts, significant changes are briefed to project management. Internal and external reporting includes the same updates and reflects the same risk and opportunity evaluations.

Annually at a minimum, a comprehensive EAC must be prepared by the CAM assigned responsibility for the work using all available information to formulate the most accurate EAC. A properly established and maintained EAC will ensure continuing visibility

into resource needs (resources, materials, etc.) and lead to project success for both the DOE and the contractor. Utilizing the management assigned responsibility for the work scope, accurate estimates by element of cost enhance the contractors' visibility into critical resource requirements.

The To Complete Performance Index (TCPI) metric must be evaluated to gauge realism of the EAC against the cumulative Cost Performance Index (CPI_{cum}).

- $TCPI_{EAC} = (BAC - BCWP_{cum}) / (EAC - ACWP_{cum}) = \text{EAC-based To Complete Performance Index}$
- The $TCPI_{EAC}$ index is compared to the CPI_{cum} index and should be within +/- .1 of the CPI for the EAC to be considered realistic.

An accurate well maintained EAC supports the customer's ability to provide sufficient funding to the project.

The guideline is further defined by QE LOI shown below.

27.A.1	Are control account EACs maintained and updated promptly based on EOC level performance impacts to the project, scope changes, schedule technical performance and schedule/cost impacts?
27.A.2	Does the contractor require the comprehensive EAC to be updated routinely (annually at a minimum) within control accounts at the level where resources are planned?
27.A.3	When preparing EACs, do the CAMs consider probable risks and opportunities from the project risk register?
27.A.4	Do the contractor's externally reported EACs and the internally generated EACs from a summarization of the CA EACs reconcile?
27.A.5	Are EACs summarized through the Work Breakdown Structure (WBS) and the Organizational Breakdown Structure (OBS) to the project level?
27.A.6	Are ETCs based on time-phased resource plans that are consistent with schedule forecast dates?
27.A.7	Is an evaluation of all subcontracted effort included in the EAC?

QE LOIs Repeated With Discussions

27.A.1 Are control account EACs maintained and updated promptly based on EOC level performance impacts to the project, scope changes, schedule technical performance and schedule/cost impacts?

Discussion

CAMs have the responsibility to review for currency their control account EACs every month during the variance analysis process. Thresholds do not have to be exceeded to change an EAC, just knowledge that the current ETC is no longer realistic and does not represent the work remaining. An update to the EAC may be because of schedule delays,

cost variances, degrading performance indices, technical performance issues, realized risks, scope changes, etc.

The ETC is prepared by resource based on variances that occur by EOC. Monthly EAC 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. It is probable that the EAC may require updating based on technical trends that may precede significant schedule and/or cost impacts. Generally, a 5% growth or savings to the EAC is considered significant enough to trigger a review of the EAC to determine if the EAC should be updated. A 10% growth or savings to the EAC requires an EAC review and update (if applicable).

CAMs need to approve any EAC update.

Effectively maintaining the control account EACs provides project management with the assurance that projected costs for completing the work are credible and that any decisions regarding the allocation of future resources is based on valid data.

Impact of Noncompliance

Failure to update the EAC based on trends understates potential impacts.

Verification Steps

Data Analysis (Automatable)

1. $X = \#$ of incomplete CA's (at a minimum) with BAC & without EAC/ $Y =$ Total # of incomplete CAs
Pass: $X/Y = 0$
Fail: $X/Y > 0$

Artifact Traces between Documents

1. Determine if EACs are maintained and updated as soon as practical.
 - a. Review the last three months of internal EVMS reports that provide the performance indices SPI and CPI.
 - b. Look for a deterioration of either the cumulative SPI or CPI over the last three months.
 - c. Review the last three months of internal EVMS reports which document the control account EACs.
 - d. Look for a change in the EAC that would be commensurate with the change in performance
 - e. Review the last three months VARs in the impact section for those CAs that show a change in performance

- f. There should be a correlation between the VARs, EACs reported in the internal reports and those CAs that declined in performance.
- g. Determine the TCPI for the CAs being reviewed by using the internal EVMS reports or by calculation. $TCPI = (BAC - BCWP_{cum}) / (EAC - ACWP_{cum})$
- h. Confirm, at the CA level, if the CPI to TCPI $< -.10$ or $> .10$, the EAC must be evaluated in the same reporting period. [over 15% complete]
- i. Otherwise, if internal reports indicate performance warranting at least a 5% growth or reduction to EAC, there must be no more than a one month delay between reporting the new EAC and the internal reports introducing these performance trends.
- j. At a minimum, even if the EACs have not yet been changed, verify the CAM can justify why the EAC is reasonable. (Add to CAM interview)
- k. The data must correlate with no inconsistencies.

Interview Questions

1. CAM: When would you change your control account EAC?
2. CAM: How do you approve the EAC?
3. CAM: Can you justify why you believe the EAC is reasonable?

27.A.2 Does the contractor require the comprehensive EAC to be updated routinely (annually at a minimum) within control accounts at the level where resources are planned?

Discussion

The comprehensive EAC is required annually and prepared, at a minimum, at the WP/planning package/SLPP level. Resources are planned within WPs at the element of cost (EOC) level, therefore resources are updated annually within the WP to prepare the comprehensive EAC. The comprehensive EAC also must be accompanied by a basis of estimate (BOE). In projects, during the monthly review cycle, CAMs review the accuracy and currency of the CA EAC at the same EOC levels and, if necessary, generate a revised CA EAC for approval.

Impact of Noncompliance

Failure to base EACs on resource requirements creates uncertainty in resources needed to complete the work scope and increases the risk of accomplishing the work.

Verification Steps

Data Analysis (Automatable)

1. $X = \#$ of incomplete WPs with zero or negative EAC / $Y =$ Total $\#$ of incomplete WPs
Pass: $X/Y = 0$

Fail: $X/Y > 0$

Artifact Traces between Documents

1. Review the EVM SD and supporting procedures to determine the frequency of comprehensive EACs.
 - a. Review the dates of the comprehensive EACs over the past year to see if the project complied with the directed frequency.
2. Determine what details support the comprehensive EAC.
 - a. Review the EAC along with any supporting data
 - b. Determine if the supporting data references resource estimates that separate EOC categories such as labor, material or subcontracted items as applicable.
 - c. Look for discussions about the amount of the resource(s) used to date and how much it will take to complete the work scope.
 - d. Note: CPI, SPI, rate and volume variances and price and usage variances should be considered as applicable, as well as consideration of resource availability.
 - e. The resource requirements by EOC must correlate to the EAC updates. Are the estimates supported by some form of BOE or justification?

Interview Questions

1. CAM: What level of detail do you go to when developing an EAC?

27.A.3 When preparing EACs, do the PM/CAMs consider probable risks and opportunities from the project risk register?

Discussion

The EAC must incorporate risks. The contractor's risks and opportunities tracking system is the repository where project risks are documented. Logically, the risks identified in the risk management system should be considered in the EAC assessment. Also a discussion of the risks and opportunities being considered is reflected in the IPMR/CPR format 5 summary analyses for the best/worst/and most likely management EAC.

Project managers should indicate in the comprehensive EAC direction the risk assumptions that the CAMS should include in the EAC update. For example, the delivery assumptions, rates to assume, technical risks, etc.

The EAC shall address identified risks, opportunities, and estimates rather than merely project the expenditure of the remaining MR. The substantiation of risks cannot be confused with the intent to expend MR. The project level EAC used for internal and external reporting should be based on the same risks and opportunities. The project manager or designated manager should review, and update as needed, the EAC for Undistributed Budget (UB) and SLPPs considering factors such as current project rate

performance and identified risks..

Impact of Noncompliance

Without considering risks, opportunities, and manager assessments, the EAC may not be accurate, and may result in potential funding issues.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Determine what details support the EAC.
 - a. Review the risk register or project documents that identify and track risks.
 - b. Review project documents identifying opportunities (if applicable).
 - c. Review the comprehensive EAC along with any supporting data
 - d. Determine if the comprehensive EAC supporting data includes risks and opportunities identified in a risk register or other project sources consistent with the System Description.
 - e. Determine if the supporting data (risk register) quantifies risks and opportunities in terms of time (days/weeks/months) and final costs.
 - f. Confirm the supporting data correlates to the best/worst/most likely EAC and discussion in the IPMR/CPR Format 5.
 - g. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: Do you include risks or opportunities in determining the EAC and if so, how?

27.A.4 Do the contractor's externally reported EACs and the internally generated EACs from a summarization of the CA EACs reconcile?

Discussion

The PM is responsible for reporting the most likely EAC each month as well as the best and worst case EACs. Also EACs are reported by WBS in Formal 1 of the IPMR/CPR and by OBS in Format 2 of the IPMR/CPR. The EACs by WBS and OBS should tie with internal reports. There also needs to be reconciliation between the summarization of EAC

from the WBS/OBS and the PM's most likely addressed in Format 5 of the IPMR/CPR. This reconciles the internal and externally reported EACs.

Impact of Noncompliance

Without reconciliation, the contractor is not using the same information to manage the project as is used to report to DOE.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Reconcile internal and external EACs.
 - a. Review the project statement of work or PEP to determine the level of EAC reporting.
 - b. Review the EACs from the last three IPMRs/CPRs by looking at the sum of the EACs reported on Format 1, column 15.
 - c. Review the sum of the EACs in the internal EVMS reports for the same periods.
 - d. Compare the Most Likely EACs (IPMR/CPR Format 1, block 6c) at the total project level to determine if this EAC is different than the column 15 EAC or the EACs in the internal reports.
 - e. The numbers must be the same at the summary level unless there is a reconciliation described in the IPMR/CPR Format 5 summary analysis.
 - f. Perform a few spot checks at different WBS levels between the internal EVMS reports and the IPMR/CPR Format 1, column 15.
 - g. If the numbers do not reconcile, verify the IPMR/CPR Format 5 discussion, as reported in PARSII, captures the reason for the delta.
 - h. Document all discrepancies as compliance concerns

Interview Questions

None

27.A.5 Are EACs summarized through the Work Breakdown Structure (WBS) and the Organizational Breakdown Structure (OBS) to the project level?

Discussion

Each control account is assigned to a single organizational element directly responsible for the work identifiable to a single element of the WBS. One or more CAs are

visible at the intersection of the WBS and responsible OBS. Both the WBS and the OBS are intended to have a logical parent-child structure. The WBS serves as the structure for summarizing and reporting performance measurement data to ensure to correct scope is aligned with the correct EAC and provided to the appropriate responsible person. The OBS also serves as the structure for summarizing and reporting performance measurement data to ensure to correct scope is aligned with the correct EAC and provided to the appropriate functional person.

This LOI describes the requirement to sum the EAC from the lowest WBS and OBS levels up to the project level.

Impact of Noncompliance

Without summarization through the WBS or OBS, the project EAC does not accurately reflect all of the control account EACs. Functional management does not have the visibility necessary to provide the resources when needed.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm summarization of EACs by WBS
 - a. Review the EACs found in the last three IPMRs/CPRs, Format 1, column 15.
 1. Summarize all the EACs at the lowest level and compare to the summary level EAC; they must be the same.
 2. Summarize the EACs at the next higher level WBS levels and compare to the reported summary level EAC (there may not be any at these levels unless contractually required).
 3. Continue this process with other higher levels of the WBS until arriving at the total project level.
 - b. Review the EACs in the internal EVMS reports for the same periods and conduct the same summarization and comparison.
 - c. Document all discrepancies as compliance concerns
2. Confirm summarization of EACs by OBS
 - a. Review the EACs found in the last three IPMRs or CPRs, Format 2, column 15.
 1. Summarize all the EACs at the lowest level and compare to the summary EAC; they must be the same.
 2. If OBS reports are available in Excel, confirming the summarization accuracy is much easier.

3. Summarize the EACs at the next higher level OBS levels and compare to the reported summary level EAC (there may not be any at these levels unless contractually required).
 4. Continue this process with other higher levels of the OBS until arriving at the total project level.
- b. Review the EACs in the internal EVMS reports for the same periods and conduct the same summarization and comparison.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

27.A.6 Are ETCs based on time-phased resource plans that are consistent with schedule forecast dates?

Discussion

The review of ETCs must always include a review of the latest schedule forecast dates, as the schedule forecast will drive costs and must be continually evaluated. Since resource allocation and availability drive the schedule forecast dates, resources included in the ETC must be planned consistently with the schedule forecast and timing. Said a different way, the ETC and the forecast schedule must demonstrate cost and schedule traceability. This also means that the resource spread in the schedule should be the same as the resource spread for discrete work in the EVM Cost Tool [assuming LOE is not in the IMS].

Impact of Noncompliance

Without time phasing the ETC, future activities will not be aligned with project deliverables.

Verification Steps

Data Analysis (Automatable)

1. $X = \#$ of incomplete CA's (at a minimum) where (IMS Forecasted start or finish dates do not align with time phased ETC in the EVM Cost Tool)/ $Y = \text{Total \# of incomplete CA's (at a minimum)}$
Pass: $X/Y = 0$
Fail: $X/Y > 0$

Artifact Traces between Documents

1. Confirm ETCs are supported by time phased resources

- a. In the CAP, review the latest time phased ETC at the detailed resource level for five separate CAs having a mix of elements of cost.
- b. Review the IMS for the same CAs and WPs.
- c. Within the CA, determine if the time phasing of resources of the ETC for a specific WP coincides with the completion date for that same WP in the IMS.
- d. The ETC and forecast IMS dates must be within the same accounting month. They should also be relatively proportional. All other factors being equal, an activity planned to start on the last day of the fiscal period should have a minimal quantity of resources versus a task planned at the beginning and going through the entire fiscal period.
- e. Document all discrepancies as compliance concerns

Interview Questions

None

27.A.7 Is an evaluation of all subcontracted effort included in the EAC?

Discussion

It is the responsibility of the prime to ensure all project work scope is reviewed in the development of the EAC. Depending on the contractual relationship, either the subcontractor or the prime may be responsible for developing the EAC. If the subcontractor develops the EAC, the prime is still responsible to review the subcontractor's submission to ensure they have followed the ground rules and assumptions.

Impact of Noncompliance

Without inclusion of subcontracted work, an EAC is incomplete to determine future funding needs or resources required to complete the work scope.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Determine if the monthly EAC analysis includes all subcontracted scope.
 - a. Review the RAM to determine if there are any subcontracts that have dedicated CAs or if there are CAs with a mix of prime and subcontractor work. Isolate the CAs and WPs for subcontractors only for the purpose of this LOI.

- b. Review the CPI metrics for the CAs/WPs to determine if the current EAC is reasonable or must be updated. The EAC can be evaluated for realism through comparison of the CPI to the TCPI.
 1. The cumulative Cost Performance Index (CPI) measures the historical efficiency of work performance. The formula is: $BCWP_{cum}/ACWP_{cum} = CPI_{cum}$. The To Complete Performance Index (TCPI) measures how efficient one must be to achieve the EAC being forecast. The formula is: $(BAC - BCWP_{cum}) / (EAC - ACWP_{cum})$. History tends to repeat itself and generally, the TCPI should be within 10% of the CPI_{cum} to be considered achievable or justified. EACs that produce a $CPI_{cum} - TCPI < -.10$ or $> +.1$ should always be adequately explained by the CAM and/or involve an EAC update. Recommend projects consider a 5% threshold that trigger an ETC trend analysis.
 - c. Compare the EAC to independent EACs calculated with CPI_{cum} and SPI_{cum} . EACs calculated by using the CPI_{cum} and CPI / SPI methods that differ from the current EAC by more than +/-10% should have an updated EAC or the CAM must have a justification why the current EAC is acceptable. The justification should be in the latest VARs.
 1. CPI_{cum} Method - The formula is: $BAC/CPI_{cum} = EAC$. This formula is always valid and is typically the minimum EAC.
 2. CPI / SPI Method – This formula includes cost and schedule performance. The formula is: $ACWP_{cum} + (BAC - BCWP) / (CPI_{cum} * SPI_{cum}) = EAC$. This formula is only valid with $SPI \leq 0$ and not valid in the last 25% of the project.
 - d. If the internal EVMS reports do not contain the CPI, SPI or TCPI, a manual calculation will need to be conducted.
2. Determine how subcontractor EACs are captured
 - a. For subcontract CAs, compare the latest EAC values in the EVM Cost Tool to the subcontractor status updates, such as the subcontractor IPMR/CPR if available. Note that the EACs in the prime's EVM Cost Tool will contain subcontractor fee, which must be contained in separate WPs.
 - b. Verify the EAC values in the EVM Cost Tool roll up to the EAC values on the IPMR/CPR Format 1.
 - c. There must be no discrepancies.

Interview Questions

1. CAM with subcontract responsibilities: How do you evaluate subcontractor performance when developing the EAC? Do you make any adjustments to the subcontractor's reported EAC? If so, explain.

27.B Subsection - CAM monthly EAC Review

On a monthly basis, the CAM must review the status of the expended effort and viability of the forecast. This analysis must focus on performance to date within the CA,

an assessment of the effort on work scope not yet completed, and an evaluation of the type and quantity of resources required to complete the remaining effort by element of cost. The CAM evaluation of EAC metrics by TCPI, Independent EAC (IEAC) formulas, and correction of any data anomalies at the CA and WP level, will more accurately reflect a valid projection of project costs. When updates are made to existing forecasts, these significant changes are briefed to project management.

The guideline is further defined by QE LOI shown below.

27.B.1	Are EACs developed and maintained by EOC?
27.B.2	Do CAMs assess the ETC on a monthly basis and update the ETC as necessary to ensure management is provided with cost and schedule forecast information to aid their decision making regarding cost and schedule impacts and risk mitigation?
27.B.3	Does the contractor use $TCPI_{EAC}$ comparisons or other IEAC formulas to validate the CAM's EAC or to indicate whether or not updates to CAM EACs might be required?

QE LOIs Repeated With Discussions

27.B.1 Are EACs developed and maintained by EOC?

Discussion

The CAMs base their forecasts for the comprehensive EAC or monthly update on detailed projections of the required resources to complete the remaining work. This must be accomplished at the element of cost level, i.e., labor, material, other direct costs, etc. by the resources expected to finish the work. This mirrors the estimating process used in initial planning of the baseline. By developing an EAC at the separate EOC level, there is no masking effect between EOCs. This produces an accurate and objective EAC.

Impact of Noncompliance

EACs that lack EOC details do not provide sufficient information to help management make decisions regarding the specific resources necessary to complete the work scope.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm EOCs are part of the EAC development

- a. Review the latest monthly EAC and supporting documentation (typically an ETC justification that the PM approves).
- b. Determine if the supporting details are discussed and justified at the EOC level. Analyze for 10 CAs.
- c. Compare the ETC prior to the monthly EAC update and after to identify if changes were made at the EOC level. Compare for 10 CAs.
- d. Document all discrepancies as compliance concerns

Interview Questions

None

27.B.2 Do CAMs assess the ETC on a monthly basis and update the ETC as necessary to ensure management is provided with cost and schedule forecast information to aid their decision making regarding cost and schedule impacts and risk mitigation?

Discussion

ETCs are the responsibility of the CAM during the monthly variance analysis cycle. Any required variance analysis is significant by nature and the EAC must be reviewed for realism and currency. There is a relationship between ongoing cost and schedule variances and the projected EAC, as the past is a good predictor of future performance. A negative cost variance should be less than or equal to the VAC (BAC – EAC). If the negative cost variance is greater than the VAC, the contractor should provide a justification in format 5 of the IPMR /CPR.

Impact of Noncompliance

The lack of timely information impedes management from making decisions which must be based on current data.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. What is the frequency for ETC assessment?
 - a. Review the System Description and ETC process to determine if CAMs are responsible for assessing the ETC monthly and updating as necessary.
 - b. Verify the monthly process mandates review of the ETC if the CVcum is worse than the VAC.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

27.B.3 Does the contractor use TCPI_{EAC} comparisons or other IEAC formulas to validate the CAM's EAC or to indicate whether or not updates to CAM EACs might be required?

Discussion

Reviewing an EAC for achievability or reasonableness is a good practice. DOE uses three formulas called Independent EACs (IEACs) to arrive at best case, most likely, and worst case range.

- CPI_{cum} Method - The Cost Performance Index (CPI) measures the historical efficiency for performing the work. The formula for CPI_{cum} is: $BCWP_{cum}/ACWP_{cum}$. This provides an EAC solely based on historical cost performance. The formula for the EAC_{cum} is: $BAC/CPI_{cum} = EAC$.
- Past 3 Month CPI Method – This formula is based on the CPI for the past 3 reporting periods. The EAC_{CPI3} is: $ACWP + [(BAC - BCWP_{cum}) / [(BCWP_4 - BCWP_1) / (ACWP_4 - ACWP_1)]]$.
- CPI / SPI Composite Method – This formula includes cost and schedule performance. The Schedule Performance Index (SPI) measures the historical performance to budget for the work. The SPI_{cum} formula is: $BCWP_{cum}/BCWS_{cum}$. The EAC COMPOSITE formula is: $ACWP_{cum} + (BAC - BCWP) / (CPI_{cum} * SPI_{cum})$. The EAC COMPOSITE is valid when SPI is ≤ 0 and not typically valid in the last 25% complete of the project.

Typically the EAC based on CPI formula provides the most optimistic result, the EAC based on SPI times CPI provides the most pessimistic, and the EAC based on 3 period CPI cum provides the most likely based on studies of hundreds of completed projects. The CPI cum and 3 period cum formulas are most accurate when the project is between 15% to 95% complete. The SPI times CPI formula is best complete. In the latter stages of the project, SPI trends toward 1.0 distort this formula. Also note the SPI times CPI formula is not the most pessimistic when SPI is above 1.0. Outside of these ranges, the formulas may not provide accurate information.

The CAM's EAC is compared to the Independent (IEAC(s)). These EACs should be within 10% of each other. Generally, a +/- 5% difference is considered significant enough to trigger a review of the EAC to determine if the EAC should be updated. A +/- 10% difference requires an EAC review and update (if applicable).

Additionally, the CPI_{cum} for past cost performance can be compared to the $TCPI_{eac}$. The To Complete Performance Index (TCPI) measures how efficient one must be to achieve the EAC being forecast. The formula is: $(BAC - BCWP_{cum}) / (EAC - ACWP_{cum})$. The TCPI should be within 10% of the CPI to be considered achievable. It is recommended at 5% the ETC be reviewed for currency. These comparisons are valuable in determining the credibility of an EAC.

Impact of Noncompliance

Without validation of an EAC, erroneous information may be developed obscuring the true needs of the control account.

Verification Steps

Data Analysis (Automatable)

Note these checks vary slightly by testing 3 different IEAC formulas for both the overstated and understated positions. They are only valid when % complete is greater than 15%.

1. $X = \#$ of CAs where $((BAC - BCWP) / ((EAC - ACWP_{cum})) - CPI_{cum} < -0.1$ for CAs that do not have $ACWP_{cum} = 0$ or $ETC = 0 / Y = \text{Total \# of incomplete CAs}$

Pass: $X/Y < 0.1$

Fail: $X/Y \geq 0.1$

2. $X = \#$ of CAs where $((BAC - BCWP) / ((EAC - ACWP_{cum})) - CPI_{cum} > 0.1$ for CAs that do not have $ACWP_{cum} = 0$ or $ETC = 0 / Y = \text{Total \# of incomplete CAs}$

Pass: $X/Y < 0.1$

Fail: $X/Y \geq 0.1$

3. At the CAM level, the total \$ value of Overstated CA EACs when % Complete $\geq 15\%$:

$X = \text{When Sum } |(Comprehensive EAC - Most Likely IEAC) > 0|$ Note: < 0 filters for Overstated CA EACs AND When $|(TCPI(EAC) - CPI_{cum})| \geq 0.1$ and $ACWP_{cum} < 0$ or $ETC < 0$,

$Y = \text{Total \$ value of incomplete CAs}$

Most Likely IEAC = Mathematically determined when the calculated EAC is the mid-point of the three EAC formulas (CPI_{cum} Method, Past 3 Month CPI Method, CPI / SPI Composite Method)

Pass: $X/Y < 0.1$

Fail: $X/Y \geq 0.1$

4. At the CAM Level, the total \$ value of Understated CA EACs when % Complete $\geq 15\%$:

X = When Sum |(ComprehensiveEAC - Most Likely IEAC) < 0| Note: < 0 filters for Understated CA EACs AND When |(TCPI(EAC) - CPIcum)| ≥ 0.1 and ACWPcum $\neq 0$ or ETC $\neq 0$,

Y = Total \$ value of incomplete CAs

Most Likely IEAC = Mathematically determined when the calculated EAC is the mid-point of the three EAC formulas (CPIcum Method, Past 3 Month CPI Method, CPI / SPI Composite Method)

Pass: $X/Y < 0.1$

Fail: $X/Y \geq 0.1$

This is not an absolute test however indicates additional interview questions. The CAM must justify why the EAC is realistic.

5. $X = \$ \text{ value of ACWP} + [(BAC - BCWP_{cum}) / [(BCWP_4 - BCWP_1) / (ACWP_4 - ACWP_1)] / EAC > 1.1$ for CAs that do not have $ACWP_{cum} = 0$ or $ETC = 0$ / Y = total \$ value of ETC for incomplete CAs

Pass: $X/Y < 1.1$

Fail: $X/Y \geq 1.1$

6. $X = \$ \text{ value of ACWP} + [(BAC - BCWP_{cum}) / [(BCWP_4 - BCWP_1) / (ACWP_4 - ACWP_1)] / EAC \leq .9$ for CAs that do not have $ACWP_{cum} = 0$ or $ETC = 0$ / Y = total \$ value of ETC for incomplete CAs

Pass: $X/Y > 0.9$

Fail: $X/Y \leq 0.9$

Artifact Traces between Documents

1. Confirm the CAM and other functional managers review the Comprehensive EAC for realism.
 - a. Based on ground rules and assumptions, review the calculation of the estimates to include all aspects of the EAC process including formulas, metrics (i.e., CPI, TCPI), quantified risks, assumptions, and EAC approval levels.
 - b. Determine if the following IEAC formulas are required to be used for validation of an EAC or as a requirement to update an existing EAC:

1. CPI Method - $BCWP/ACWP = CPI$. $ACWP + BAC/CPI$.
2. CPI / SPI Method – $ACWP_{cum} + (BAC - BCW_{cum}) / (CPI_{cum} \times SPI_{cum}) = EAC$.
- c. Determine if the following CPI_{cum} to $TCPI_{eac}$ comparison is required to be used for validation of an EAC or as a requirement to update an existing EAC.
 1. $CPI_{cum} - TCPI_{cum}$
- d. While all of the formulas will assist in reviewing an EAC for robustness, verify the base estimate is a manual estimate from those closest to the work.
- e. For EACs greater +/- 10% of IEACs calculation, review and verify the EAC value of the base estimate.
- f. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: What IEACs are used to validate the monthly/comprehensive EAC?

27.C Subsection - Project Manager/Total Project Monthly EAC

The monthly total project EAC is summarized by the Project Manager in coordination with the CAMs, functional management, and with respect to resource allocations. The monthly EAC also includes the subcontractor assessment, including fees, and any reconciliations. As part of a routine and consistent process, the project level EAC may involve workaround plans if resources are not available as scheduled to complete the remaining effort. These revisions may result in forecast changes, including revised time phasing of resources, resulting in an updated manpower spread.

At the project level, as a sum of the WBS and OBS EACs, the contractor's externally reported EAC and internal EAC must reconcile and have clear traceability, based on the identified risks and opportunities, as well as formally tracked variance analysis corrective actions. Any differences between the CAM's forecast and the Project Manager's assessment are outlined in the IPMR/CPR Format 5.

While internal EACs may determine funding requirements, a total project EAC in excess of the budget is not an authorization to proceed in excess of budget until management has reviewed with the customer and both have sanctioned this revision as necessary and the DOE customer has approved it

The guideline is further defined by QE LOI shown below.

27.C.1	Is the monthly EAC update conducted in accordance with the contractor's documented EVM process and any supplemental processes?
27.C.2	Are internal and subcontract EACs consistent with the EACs reported to the DOE?
27.C.3	Are subcontractor fees, if applicable, included in the ETC and Comprehensive EAC forecasts in accordance with Prime EVMS procedures?
27.C.4	Is the EAC process consistent with the impacts and corrective actions found in the variance analysis reports?

QE LOIs Repeated With Discussions

27.C.1 Is the monthly EAC update conducted in accordance with the contractor's documented EVM process and any supplemental processes?

Discussion

The contractor must have an EVMS SD or a process documenting how to conduct the monthly EAC update. This process must be followed to ensure a consistent approach across all CAs in the project and through the life of the project.

Impact of Noncompliance

Without following a sound EAC process, the information will be inconsistent and create an inaccurate EAC.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify for three months that the monthly EAC was updated consistent with the documented process.
 - a. Review the SD and supporting EAC process(s) for the monthly process and when monthly EACs are required.
 - b. Review the EACs for the past three months to verify that the monthly EAC been updated when warranted.
 - c. Document all discrepancies as compliance concerns
2. Conduct a trace to determine EAC reconciliation.
 - a. Compare the EAC totals in the IPMR/CPR Format 1 (total must correspond to the Most Likely EAC) and in the Format 2 (if required) to the EVM Cost Tool EAC totals for the current accounting period. See LOI 27.A.4 for more guidance.
 - b. Check the Format 1 Most Likely EAC is reconcilable to the corresponding CFSR EAC (quarterly requirement and includes fee), if the CFSR is required.
 - c. If disparities exist between externally reported EACs and the internal totals, check the IPMR/CPR Format 5 explanations for any documentation regarding differences between internal reporting of the CAMs CA level EACs and external reporting requirements (Management Most Likely EAC). See LOI 27.A.4 for more guidance.
 - d. If the totals do not correspond, and there is no formal documentation, there is no reconciliation.
 - e. Document all discrepancies as compliance concerns

Interview Questions

1. PM: When do you update the monthly EAC? What are the factors or drivers that would cause you to need to update the monthly EAC?
2. PM: What is the approval process for the monthly EAC?
3. PM: What process do you use to develop the best/worst/most likely EACs for the IPMR/CPR?

27.C.2 Are internal and subcontract EACs consistent with the EACs reported to the DOE?

Discussion

The prime contractor has responsibility for the entire project work scope, including subcontracted effort. Normally, the prime assigns a CAM to manage the subcontracted effort and the CAM has the responsibility to ensure the subcontractor's performance and forecasting is accurately reported. If the CAM disagrees with a subcontractor's EAC, it is incumbent on the CAM either to reach concurrence with the subcontractor or document the difference and report the EAC as accurately as possible. Any differences between what the subcontractor reports to the prime and what the CAM's EAC is must be documented in Format 5 of the IPMR/CPR.

The prime generates internal EACs at the lowest level, including the subcontract EACs, and then summarizes the EAC at the reporting level for DOE in the IPMR/CPR. It is vital that the internal EACs are consistent with the reported EAC for proper notification to the customer of potential cost overrun and potential impacts to funding requirements.

Impact of Noncompliance

Without agreement between the CAM and subcontractor, the CAM's and subcontractor's execution plans are not aligned with project goals and deliverables. Funding will also not be aligned, leading to potential funding issues.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Conduct a trace between the subcontractor EAC and the subcontractor reported EAC in the prime EVM Cost Tool.
 - a. Review the RAM for subcontractor CAs. Review the total project time phasing to see if any subcontracts are planned.
 - b. Compare the subcontractor EAC with the equivalent EAC in the prime tool. Are they the same for the same scope of work? If not do they reconcile and discussed in the IPMR/CPR format 5?
 - c. Document all discrepancies as compliance concerns

Interview Questions

1. CAM with subcontracts: Are supplier EAC updates included in monthly communication and reports for IMS performance updates, and/or for ACWP progress payment requests?

27.C.3 Are subcontractor fees, if applicable, included in the ETC and Comprehensive EAC forecasts in accordance with Prime EVMS procedures?

Discussion

The entire cost of the subcontracted work must be reported in the EAC. This includes any fees to the sub, as this is a cost to the prime which is passed on to the government. Subcontractor fee must be planned in a separate WP.

Impact of Noncompliance

Without inclusion of the subcontractor's fees, the EAC will be under estimated, leading to inaccurate funding requirements.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the WBS(s) that is responsible for subcontracts if applicable.
2. Examine the fee plan WPs for 12 months. Has the control account updated the ETC over the period for actual fee performance (Award, Incentive) as applicable? Or is the ETC equal the BCWS and actual performance is less than 100%.

Interview Questions

1. CAM: How do you ensure accurate subcontractor fees performance trends are reflected in the ETC and comprehensive EAC values?

27.C.4 Is the EAC process consistent with the impacts and corrective actions found in the variance analysis reports?

Discussion

The contractor has a monthly routine for planning, measuring performance, conducting variance analysis, forecasting and reporting. Variances that breach the thresholds require a VAR to be developed by the CAM that includes corrective actions for cost and schedule mitigation. The corrective actions have a direct impact on the EAC of the control account and for that reason are closely integrated. Based on the status and variance analysis process, the results need to be incorporated into the PM forecast of overall EAC and the worst/best/most likely assessments. The PM must also track the analysis results and be looking for recurring trends.

Impact of Noncompliance

The lack of integration means the corrective actions may not align with the EACs defeating the intent of corrective actions.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Conduct a manual trace between corrective actions and EAC revisions.
 - a. For 10 CAs that breach the variance thresholds, determine how many list an adjustment to the EAC. Examine both the impacts and corrective actions.
 - b. Using the EVM Cost Tool, locate the data for the accounting period corresponding to the log, plus two accounting periods previous to this one.
 - c. Based on actual dates of completion on the corrective action log, determine when EAC adjustments were to be made, and check the data for the corresponding period to make sure these changes have been made, and are traceable between the log and the EAC adjustments.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

27.D Subsection - Comprehensive EACs

The Comprehensive EAC (or bottom up EAC) is conducted at least annually, or as stipulated in the Contractor's EVM SD. This process will need to be repeated more frequently if project performance deems the current EAC is no longer valid. While the monthly EAC is a routine assessment, the Comprehensive EAC process addresses all facets of the project. This must include, but not be limited to, ground rules and assumptions, an overall schedule for completing the Comprehensive EAC, identification of templates used to update the EAC, and the final approval process. The customer also needs notification if a funding constraint is breached per guidance in the contract or DOE O 413.3B.

In addition to items reviewed on a monthly basis, the Comprehensive EAC includes the following in the estimates:

- The Comprehensive EAC has a Basis of Estimate (BOE) and is validated by IEAC calculations.
- The Comprehensive EAC is compared to the BAC, and any delta is captured as a VAC ($BAC - EAC = VAC$).
- The assessment of performance to date efficiency achieved by performing organizations for completed work as compared to remaining budgets and remaining scope of work.
- Assessment of commitment values for material to complete the remaining work.
- Evaluation of major subcontractors in terms of cost assessments to complete their efforts, based on the most current information available (includes subcontractor fees).
- Assessment of rate and volume variance analysis when determining labor estimates to complete.
- Assessment of price and usage variance analysis when determining material estimates to complete.
- Incorporation of project level risks and opportunities that have not yet been incorporated into the cost and schedule baseline.
- Future improvements to facilities or other capital investments that may improve cost and schedule performance in the future.
- Estimation of any future conditions affecting the EAC in terms of projected rate changes, process improvements, or other economic factors that may impact future costs.

The guideline is further defined by QE LOI shown below.

27.D.1	Do Comprehensive EACs include performance to date assessments for direct and indirect costs?
27.D.2	Do Comprehensive EACs include assessments of all the material to complete (commitment and uncommitted values) the remaining work?
27.D.3	Do Comprehensive EACs include an estimation of future conditions to derive the most accurate estimate at completion, e.g., projected rate changes, process improvements that may result in reduced costs, or other economic factors that may impact future costs?
27.D.4	Does the Comprehensive EAC have a basis of estimate for each control account involved?
27.D.5	Are VACs determined by subtracting the EACs from the BAC consistent with the DOE EVM Gold Card?
27.D.6	Is the project EAC/ETC compared against resource availability?
27.D.7	Are the direct/indirect rates used for calculating ETCs using the latest information available?
27.D.8	Are the CAMs able to forecast EACs without funding constraints and is the comprehensive EAC inclusive of the impacts, if any, because of funding constraints?
27.D.9	If the comprehensive EAC reflects an issue with funding constraints does the Contractor provide early warning to the customer?
27.D.10	Is the Comprehensive EAC at the project level validated with IEACs/TCPIs for reasonableness?
27.D.11	When developing a comprehensive EAC, does the contractor evaluate authorized remaining project scope, reassessing all EAC assumptions, taking into account the past performance, economic escalation, factored risks/opportunities and resource considerations by element of cost?
27.D.12	Does the comprehensive EAC include cumulative actuals to date plus an ETC for all remaining incomplete work scope?

QE LOIs Repeated With Discussions

27.D.1 Do Comprehensive EACs include performance to date assessments for direct and indirect costs?

Discussion

Comprehensive EACs are developed at the lowest level, i.e., control account/WP level by the CAMs. Typically, the CAMs provide the input for the direct portion of the estimate in labor hours by category, material costs, and other direct costs. The CAMs must consider past performance, with trend analysis of ongoing cost and schedule variances when developing detailed projections for the direct portion of the EAC. These estimates should be based on previous performance, risks and opportunities that impact the incomplete work scope, planned corrective actions, and their knowledge of future risks to performance. The CAM should consider the ongoing analysis for labor variances (rate

vs. volume), as well as the analysis for material variances (price vs. usage) when developing the ETC.

The comprehensive EAC should also include an evaluation of subcontractor assessments of cost to complete their efforts. For major subcontracts, the prime contractor CAM is responsible for ensuring timely and reliable EACs for situations when the subcontractor has not provided their most current information available.

After incorporation into the EVM Cost Tool, project controls personnel apply the most current set of direct and indirect rates to fully burden the estimate.

Impact of Noncompliance

Failure to include direct and indirect performance, results in an incomplete EAC which will not provide accurate information.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

None

Interview Questions

1. CAM: how do you evaluate past performance when developing your estimates for a comprehensive EAC?
2. Project Controls: what set of direct and indirect rates do you use when burdening the direct estimates for the comprehensive EAC?

27.D.2 Do Comprehensive EACs include assessments of all the material to complete (commitment and uncommitted values) the remaining work?

Discussion

The formula for determining the EAC is: $\text{Cumulative ACWP} + \text{ETC} = \text{EAC}$. The ETC portion includes all incomplete work scope, including the broad class of material (all material items, raw stock, equipment, etc.). The cost for all future material must be included in the ETC, including open purchase orders for material that has not yet been received and paid for, as well as uncommitted values for future purchase orders. The CAM should consider price and usage variance analysis when determining material estimates to complete.

When a purchase order for material has been placed, the commitment value of the purchase order should become the basis for the EAC. After subtraction of actual costs to date, the cost for all material that has not yet been received and paid for should then be the basis for the ETC. Typically, purchase orders for material are placed on a fixed price basis meaning that the price is fixed, but if another contracting method has been used, the CAM may need to make adjustments for cost issues.

If purchase orders have not yet been placed, the CAM should base the EAC on the planned purchase order value, with any updates that are known for market conditions or potential changes to the purchase order such as change of vendor, strategy, etc.

Unless justified, the material ETC must be greater than or equal to the current cumulative commitment value.

Impact of Noncompliance

EACs that contain incomplete material estimates lead to erroneous funding requirements.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify Material Commitment Report values are sufficient to complete the project.
 - a. Using the EVM Cost Tool, select 10 CAs containing an element of cost for material.
 1. Compare the latest CA EAC values in the EVM Cost Tool to the Material Commitment Report.
 2. Compare the open purchase orders for material to the Comprehensive EAC for remaining material.
 3. Check the ACWP for material in the EVM Cost Tool and/or reports from the MRP system.
 4. The commitment values for material should correspond to the ETC for remaining work.
 5. Determine if there are any future purchase orders for material that have not yet been committed.
 6. The sum of ACWP + ETC (remaining commitment values + uncommitted purchase orders) must equal the EAC.
 - b. Document all discrepancies as compliance concerns

Interview Questions

1. Material CAM: How do you develop the EAC for your assigned material items? Have you made any EAC adjustments to planned purchase orders that have not

yet been committed?

27.D.3 Do Comprehensive EACs include an estimation of future conditions to derive the most accurate estimate at completion, e.g., projected rate changes, process improvements that may result in reduced costs, or other economic factors that may impact future costs?

Discussion

The comprehensive EAC is not limited to those factors controlled specifically by the project. It must include as applicable such factors as site conditions that affect project performance, facility improvements, capital investments, process improvements, direct labor rate changes and indirect rate changes. Also, if there are other factors from different sites that impact this project, the contractor should address them as well. An example of this would be corporate overhead rates that affect multiple sites, such as nuclear transportation.

Impact of Noncompliance

Without considering future economic conditions, EACs will be inaccurate leading to erroneous funding requirements.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm that the SD and EAC process documents address inclusion of future conditions, such as process improvements, facility or capital improvements, etc. The guidance should document that the most current set of direct and indirect rates be used in the EAC. Should these rates not cover the entire duration of a specific project, the contractor must project the rates for the out years on a similar, rational basis, based on sound estimates for indirect pools and bases. (See Guideline 13.A.3)
2. Review the last comprehensive EAC. Was an estimation of future conditions to derive the most accurate estimate at completion, e.g., projected rate changes, process improvements that may result in reduced costs, or other economic factors that may impact future costs addressed?

Interview Questions

1. Project Manager: When building a comprehensive EAC, how are future conditions best estimated?

2. Project Controls: What direct and indirect rates were used in the last comprehensive EAC? Did you need to project any rates for out years?

27.D.4 Does the Comprehensive EAC have a basis of estimate for each control account involved?

Discussion

During a comprehensive EAC, the ETC must be updated for all open and future CAs. The actual cost for closed CAs will be captured in the actual costs to date. During the estimating process for the open and future CAs, the CAMs must document the basis of the estimate in the format specified by the project manager. This ensures proper review of the ETC, as well as providing a basis for future ETC updates and variance analyses.

Impact of Noncompliance

Without a basis of estimate, the EAC has not been developed using a consistent process and the validity of the EAC is jeopardized.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the last comprehensive EAC and see if it included a basis of estimate.
 - a. Obtain the information for the last comprehensive EAC update.
 - b. Review the EAC changes - are they supported by a Basis of Estimate and approved?
 - c. Document all discrepancies as compliance concerns

Interview Questions

1. Project Manager: Please show the detailed documentation for the last completed Comprehensive EAC.

27.D.5 Are VACs determined by subtracting the EACs from the BAC consistent with the DOE EVM Gold Card?

Discussion

One of the fundamental EVMS formulas is: $BAC - EAC = VAC$. This is the only formula used to determine the variance at completion. This can be calculated at any level of the data.

Impact of Noncompliance

Without comparing the EAC to the BAC, a VAC cannot be determined.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Determine that the VAC is properly calculated at all levels.
 - a. Obtain the last three IPMR/CPR reports and perform spot checks of the VAC calculation at different levels and at the project level.
 - b. Compare the VAC at the summary level for the period in the EVM Cost Tool with the VAC as reported on the IPMR/CPR Format 1.
 - c. An analysis of the VAC must include what underlying elements of work caused the deviation from the BAC, and what corrective actions, if any, are being implemented. (See LOIs 23.B.1 and 23.B.2)
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

27.D.6 Is the project EAC/ETC compared against resource availability?

Discussion

The EAC forms the basis for future resource requirements such as specific labor by category, equipment, facilities, etc. There may be conflicting requirements at the facility or company level for these resources. Shortages and overages must be coordinated with functional management to ensure the EAC is achievable.

The EACs must be the result of a fully-staffed effort including top management participation to ensure that needed resources (budget, manpower, special skills, etc.) are available for the remaining effort.

Impact of Noncompliance

Failure to compare the EAC to resources available may lead to an unrealistic EAC placing the project completion at risk.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Is the EAC reconcilable to the forecast tasking in the IMS?
 - a. Verify, if resources are not available, that replanning or work-around plans are being developed and are reflected in the IMS to accomplish the activity within the limited resources or at a later time when the resources can be made available.
 - b. Using the IMS, verify that the latest Comprehensive EAC reflects data traceable to the corresponding current IMS, as stated to time now.
 - c. If the IMS is resource loaded, check the WPs for baseline and forecast dates, plus baseline and forecast resource requirements, and then confirm the accuracy of import or transfer to the EVM Cost Tool.
 - d. If the IMS is not resource loaded, confirm the EVM Cost Tool is in alignment with the IMS for both baseline and forecast dates, plus baseline and forecast resources.
 - e. Note: Periodic checks must be performed to ensure the EVM Cost Tool remains aligned with the data in the IMS as differences in calendars, EVM Cost Tool import options, plus errors in activity coding and selection may result in discrepancies between the systems.
 - f. Based on the trace, confirm the EAC value reflects the remaining work in the IMS.
 - g. Document all discrepancies as compliance concerns

Interview Questions

None

27.D.7 Are the direct/indirect rates used for calculating ETCs using the latest information available?

Discussion

The accuracy of forecasts is dependent on using the latest information available during development of the ETC. The project office typically coordinates rate information with accounting or finance to ensure they incorporate accurate and current data in the ground rules and assumptions. The latest forecast rates for direct and indirect costs must be used as of the time of the formal EAC kickoff. Should these rates not cover the entire duration of a specific project, the contractor must project the rates for the out years on a

similar, rational basis, based on sound estimates for indirect pools and bases. (See QE LOI 13.A.3)

Impact of Noncompliance

Failure to use the latest rate information available leads to an inaccurate EAC and potential funding issues.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the last comprehensive EAC kickoff package. Reconcile with the latest indirect rates at the same time. Where the latest indirect rates used in the comprehensive EAC update at the kickoff time?
2. Review the forecast for direct rates which usually change with salary increase cycles and significant hiring/layoff periods. Were the latest direct rates used as a bases for the comprehensive EAC?

Interview Questions

None

27.D.8 Are the CAMs able to forecast EACs without funding constraints and is the comprehensive EAC inclusive of the impacts, if any, because of funding constraints?

Discussion

When the CAM develops the ETC or EAC, they must estimate what resources are necessary to complete the work scope. Funding constraints are not considered during the initial ETC development. The EAC is used to help project management and the DOE determine if the available funding is sufficient or alternatives need to be considered.

The completed/approved ETC must be reviewed against the funding constraints, if any, that are applicable. Any impacts must be discussed with the customer. If no relief is possible, the ETC must be re-time phased to be consistent with any funding limitation for the period. This will ensure that the EAC has the full impact of the funding constraints included in it. However, the intent of this QE LOI is that the EAC must be the best forecast without funding consideration so that the total requirements are known before the impacts are assessed.

Impact of Noncompliance

Failure to have a realistic plan and then compare the plan against funding constraints likely results in a plan that is not executable.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Compare the last comprehensive EAC to the funding constraints. Is the ETC consistent with the funding constraints?
 - a. Document all discrepancies as compliance concerns
2. Review the last comprehensive EAC kickoff package. Verify that funding constraints are not mentioned in CAM requirements and if mentioned at all it is in the final review process.
 - a. Document all discrepancies as compliance concerns

Interview Questions

1. PM: Do you have any documentation that demonstrates the ETC update considered funding constraints, if any, and that the CAMs are not constrained in their initial inputs?

27.D.9 If the comprehensive EAC reflects an issue with funding constraints does the Contractor provide early warning to the customer?

Discussion

If the EAC exceeds a funding constraint, the contractor follows applicable requirements and guidance in the contract and DOE O 413.3B to determine the appropriate course of action. This may include involvement with the PME, CFO or PMOA, or updates to the Project Data Sheet (PDS) and the Funding Profile.

Impact of Noncompliance

Failure to communicate funding breaches constitutes a violation of the contract or DOE O 413.3B or both.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

None

Interview Questions

1. Project Manager: Who would you contact to discuss a funding breach, and what would be the timeline for this communication?

27.D.10 Is the Comprehensive EAC at the project level validated with IEACs/TCPIs for reasonableness?

Discussion

Reviewing an EAC for achievability or reasonableness is a good practice at the project level. There are two checks of EAC realism that should be performed: comparison of the CPI_{cum} to the $TCPI_{eac}$ and then comparison of the EAC to two independent EACs (IEAC).

- Comparison of CPI_{cum} to $TCPI_{eac}$: The To Complete Performance Index (TCPI) measures how efficient one must be to achieve the EAC being forecast. The formula is: $(BAC - BCWP_{cum}) / (EAC - ACWP_{cum})$. The TCPI must be within 10% of the CPI to be considered achievable or justified.
- Comparison of EAC to the best case/worst case IEACs to provide a range:
 - Cum CPI Method - The Cost Performance Index (CPI) measures the historical efficiency for performing the work. The formula is: $BCWP/ACWP = CPI$. The IEAC based on this past performance is calculated as $IEAC = BAC/CPI_{cum}$. This provides an EAC solely based on historical cost performance.
 - CPI / SPI Method – This formula includes cost and schedule performance. The formula is: $ACWP_{cum} + (BAC - BCWP) / (CPI_{cum} * SPI_{cum}) = IEAC$.
 - The two EACs should be within 10% of each other. Should there be larger differences, the project manager should review the EAC for CAs that may have driven the EAC higher than necessary.

These comparisons are valuable in determining the credibility of an EAC.

Impact of Noncompliance

Without validation of an EAC, erroneous information may be developed obscuring the true needs of the project.

Verification Steps

Data Analysis (Automatable)

1. $X = \# \text{ of CAs where } ((ACWP_{cum} + (BAC - BCWP_{cum})) / (CPI_{cum} \times SPI_{cum})) / EAC > 1.1$ for CAs that do not have $ACWP_{cum} = 0$ or $ETC = 0/Y = \text{Total \# of incomplete CAs}$
Pass: $X/Y \leq 1.1$
Fail: $X/Y > 1.1$
2. $X = \# \text{ of CAs where } ((ACWP_{cum} + (BAC - BCWP_{cum})) / (CPI_{cum} \times SPI_{cum})) / EAC < .9$ for CAs that do not have $ACWP_{cum} = 0$ or $ETC = 0/Y = \text{Total \# of incomplete CAs}$
Pass: $X/Y < 0.1$
Fail: $X/Y \geq 0.1$
3. $X = \# \text{ of CAs where } TCPI(EAC) - CPI > 0.1$ for CAs that do not have $ACWP_{cum} = 0$ or $ETC = 0/Y = \text{Total \# of incomplete CAs}$
Pass: $X/Y < 0.1$
Fail: $X/Y \geq 0.1$

At the CAM Level, the total number of Overstated CA EACs when % Complete $\geq 15\%$:

4. $X = \# \text{ of CAs where } TCPI(EAC) - CPI < -0.1$ for CAs that do not have $ACWP_{cum} = 0$ or $ETC = 0/Y = \text{Total \# of incomplete CAs}$
Pass: $X/Y < 0.1$
Fail: $X/Y \geq 0.1$
5. $X = \$ \text{ value of } (VAC - CV_{cum})$ for CAs where $TCPI(EAC) - CPI > 0.1$ for CAs that do not have $ACWP_{cum} = 0$ or $ETC = 0/Y = \text{total \$ value of ETC for incomplete CAs}$
Pass: $X/Y < 0.1$
Fail: $X/Y \geq 0.1$
6. $X = \$ \text{ value of } (VAC - CV_{cum})$ for CAs where $TCPI(EAC) - CPI < -0.1$ for CAs that do not have $ACWP_{cum} = 0$ or $ETC = 0/Y = \text{total \$ value of ETC for incomplete CAs}$
Pass: $X/Y < 0.1$
Fail: $X/Y \geq 0.1$

Artifact Traces between Documents

1. Confirm the project manager and project control staff verifies the realism of the comprehensive EAC at the project level.
 - a. Determine if the following EAC realism checks are required and have been used for validation of an EAC or as a requirement to update an existing EAC:
 1. Comparison of CPI_{cum} to $TCPI_{eac}$
 2. Comparison of EAC to Cum CPI IEAC
 3. Comparison of EAC to CPI / SPI IEAC
 4. CPI Method - $BCWP/ACWP = CPI$.
 - b. While all of the formulas will assist in reviewing an EAC for robustness, verify the base estimate is a manual estimate from those closest to the work (the CAM).
 - c. For EACs > +/- 10% of IEACs calculation, review and verify the EAC value of the base estimate.
 - d. Document all discrepancies as compliance concerns

Interview Questions

1. Project Manager: How do you check the realism of the comprehensive EAC?

27.D.11 When developing a comprehensive EAC, does the contractor evaluate authorized remaining project scope, reassessing all EAC assumptions, taking into account the past performance, economic escalation, factored risks/opportunities and resource considerations by element of cost?

Discussion

The formula for determining the EAC is: Cumulative ACWP + ETC = EAC. The ETC portion includes all incomplete work scope (this includes WPs, PPs, SLPPs and UB). The CAMs base their forecast for the comprehensive EAC on detailed projections of the required resources to complete the remaining work. This must be accomplished at the element of cost level, i.e., labor, material, other direct costs, etc. Additionally, the CAM must consider past cost and schedule performance, as well as future risks and opportunities when developing the comprehensive EAC.

The comprehensive EAC process begins with documentation of the ground rules and assumptions issued by the project manager, to include guidance on inclusion of risk and opportunities, date of the forecasted IMS to be used, date of latest labor and indirect rates, templates, due dates, etc. The comprehensive EAC must always be based on a realistic IMS, as described in 27.A.6, so this is generally the first step in generation of the comprehensive EAC. The project manager may elect to kick off the comprehensive EAC process with a meeting or issue a set of guidance for the EAC.

The project manager should also incorporate costs for project level risks and opportunities that have not yet been incorporated into the cost and schedule baseline

It is vital that only contractually authorized work is included in the comprehensive EAC, i.e., only the work either currently authorized on the basic contract, by contract mod, or by DOE contracting officer official direction for authorized unpriced work (AUW). This direction must also be clearly specified in the ground rules and assumptions, along with direction not to include any potential changes. Note that this does not preclude the inclusion of risk estimates for currently authorized work, as this must be included.

The CEAC provides project management assurance that all factors impacting the total cost to complete project objectives have been considered.

Impact of Noncompliance

Without following a sound EAC process, the information will be inconsistent, resulting in an inaccurate EAC.

Verification Steps

Data Analysis (Automatable)

1. $X = \$ \text{ value of CAs (at a minimum) where completed work absolute values (BCWP}_{cum} - BAC) = 0 \text{ and ETC} > 0 / Y = \text{ total value of CAs (at a minimum)}$
Pass: $X/Y = 0$
Fail: $X/Y > 0$

Artifact Traces between Documents

1. Confirm proper guidance is provided to project personnel developing the comprehensive EAC
 - a. Review the EAC process in the System Description or EVM supporting processes that describes the comprehensive EAC process.
 - b. Review the last comprehensive EAC documentation including the ground rules and assumptions and kickoff meeting content.
 - c. Confirm the process or the project specific ground rules and assumptions provide guidance regarding the following:
 1. Cut-off dates for the cumulative BCWS, BCWP and ACWP
 2. The remaining BCWS by EOC
 3. Level of detail required by EOC
 4. Risks and opportunities to be included in the ETC
 5. Guidance regarding rates to be used
 6. Issues regarding availability of resources
 7. A schedule for completion of the comprehensive EAC
 8. Basis of estimate requirements
 9. Guidance on inclusion of authorized work only, with exclusion of unauthorized work such as potential changes
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

27.D.12 Does the comprehensive EAC include cumulative actuals to date plus an ETC for all remaining incomplete work scope?

Discussion

The formula for determining the EAC is: Cumulative ACWP + ETC = EAC. The ETC portion includes all incomplete work scope (this includes WPs, PPs, SLPPs and UB). As noted above in 27.A.9, the cutoff date for cumulative ACWP must be consistent for all CAs in the comprehensive EAC.

Impact of Noncompliance

An incomplete EAC is not useful to determine future funding needs or resources required to complete the work scope.

Verification Steps

Data Analysis (Automatable)

1. At the CA level (at a minimum), $X = (ACWP_{cum} - (EAC - ETC)) / Y = \$ \text{ value of } ACWP_{cum}$
Pass: $X/Y = 0$
Fail: $X/Y > 0$

Artifact Traces between Documents

1. Review the EAC process that covers the comprehensive EAC
 - a. Review the last comprehensive EAC documentation including the ground rules and assumptions.
 1. Confirm that the ground rules and assumptions provide guidance regarding the cutoff date for cumulative ACWP.
 - b. Confirm the last comprehensive EAC includes the cumulative ACWP plus an ETC for remaining scope.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

Guideline 27 – Typical Artifacts Common to the QE LOIs

- EAC process
- VAR process

- EVMS SD
- Project Risk Register
- Last Comprehensive EAC
- EAC reconciliations if applicable
- EAC details supporting control account EACs
- CAPs reflecting time-phased ETC
- Bill of Materials (BOM)
- Project Integrated Master Schedule (IMS) focused on schedule forecast dates
- Internal and external management reports, such as IPMRs or CPRs
- Contract Funds Status Report (CFSR), if applicable
- Subcontractor reports containing subcontract EACs
- Ground rules and assumptions supporting comprehensive EACs
- Management reports from EVM Cost Tool
- Forward Pricing Rate Agreement/Proposal
- Indirect cost variance analyses

SECTION 6.0 REVISIONS AND DATA MAINTENANCE (GUIDELINES 28-32)

The Revisions and Data Maintenance category focuses on maintaining an accurate and reliable Contract Budget Base (CBB) and Performance Measurement Baseline (PMB) throughout its PoP. The objective of the five guidelines (28 – 32) that comprise this category is to establish the requirements for implementing a formal change control process that will preserve the integrity of the PMB and corresponding Earned Value Management System (EVMS) data. These guidelines ensure that the PMB reflects the most current plan for accomplishing the effort thus providing credible performance measurement data that management can rely on to make project-related decisions.

As the PMB represents the agreed-upon plan between the contractor and government for how contractually authorized work is accomplished and measured, any changes to the plan must be formally controlled and properly documented using a systematic approach. Ensuring authorized contractual changes are incorporated into all affected budgets, schedules, work authorizations, and other project documentation in a timely manner prior to the commencement of that work ensures the PMB reflects all authorized work scope (Guideline 28). Implementation of the Revisions and Data Maintenance guidelines requires the contractor to use a disciplined change control process that maintains the integrity of cost and schedule data when incorporating authorized revisions to the project's scope, schedule, and/or budgets (Guideline 29). To maintain the accuracy/validity of performance measurement data, and its use for making reliable cost/schedule projections, retroactive changes to the data must be controlled and limited to certain circumstances only (Guideline 30).

The source of revisions to the PMB can be either internally or externally driven and may affect all categories of an EVMS. Consistent and systematic use of a baseline change control process prevents unauthorized revisions to the CBB and PMB (Guideline 31). It is important that authorized baseline revisions are documented, managed, tracked and reported to the project manager and the government in a timely manner (Guideline 32).

The following section describes the DOE interpretation of the Revisions and Data Maintenance section.

Guideline 28 – Incorporate Changes in a Timely Manner

Incorporate authorized changes in a timely manner, recording the effects of such changes in budgets and schedules. In the directed effort prior to negotiation of a change, base such revisions on the amount estimated and budgeted to the project organizations.

This guideline is further organized into two categories for further understanding.

- Incorporate Negotiated Changes
- Authorized Unpriced Work

Incorporate Negotiated Changes: The requirements for handling the incorporation of DOE directed changes.

Authorized Unpriced Work (AUW): A unique aspect of implementation is reacting to non-formal changes. This section sets the minimum expectation for handling AUW.

28.A Subsection - Incorporate Negotiated Changes

Change is inevitable and as projects progress, new concepts or opportunities surface, and risks are realized impacting the original plan that may now need revision. Incorporating negotiated changes is conducted in a very controlled manner. This controlled process preserves the integrity of the original plan, allowing a clear understanding of what is changing. Authorized changes are processed in a timely manner, within two accounting periods after the DOE approved change document and one accounting period after the approval of the contractor baseline change documentation (e.g., Baseline Change Proposal (BCP), Baseline Change Request (BCR), etc.). Project documentation is revised consistent with the authorized contractual change ensuring the new project direction is supported by revised budgets, schedules and forecasts. Maintaining up-to-date project documentation is also important to ensure the most recent negotiated changes are incorporated into the EVM system.

The guideline is further defined by QE LOI shown below.

28.A.1	Are authorized changes incorporated in the CBB, PMB and the IMS no later than one full accounting period following the contractor baseline change documentation approval?
28.A.2	Is UB distributed to or removed from Control Accounts or Summary Level Planning Packages as soon as practicable, but not later than two accounting periods after the DOE approved change document?
28.A.3	Does the contractor incorporate authorized changes into the IMS, EVM Cost Tool, CBB Log, and Work Authorization in the same accounting period?
28.A.4	When implementing external changes, does the CAM use realistic resource requirements for the scope of work?
28.A.5	Are PMB changes consistent with any funding restrictions?

Guideline 28 – Incorporation of Negotiation Changes

QE LOIs Repeated With Discussions

28.A.1 Are authorized changes incorporated in the CBB, PMB and the IMS no later than one full accounting period following the contractor baseline change documentation approval?

Discussion

A properly maintained and up-to-date PMB and IMS are crucial to effective project management. The timely and accurate incorporation of contractual changes ensures that the information generated from the execution of the baseline plan provides an accurate picture of progress and facilitates appropriate management actions and decisions.

These authorized changes must be made as soon as is practicable to both the IMS and to the PMB in order to ensure an integrated baseline. Authorized changes must be incorporated no later than one full accounting period following the baseline change documentation approval. Exceptions to this rule are rare and must have FPD approval.

Any modification to the CBB and/or PMB shall not commence without the authorized technical work scope, PoP, and associated budget.

Impact of Noncompliance

Without timely incorporation of authorized changes, the baseline does not reflect the current authorized work scope from contractual changes, which prevents the proper execution of authorized work.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm the process or EVM SD addresses the timely incorporation of new work scope no later than one full accounting period after baseline change documentation approval.
 - a. Does the document clearly state the requirement for timely incorporation of new work scope, but no later than one full accounting period following baseline change documentation approval?
 - b. Document all discrepancies as compliance concerns

2. Confirm baseline changes are incorporated no later than one full accounting period following baseline change documentation approval.
 - a. Review the control account reports from the EVM Cost Tool with an “as of” date that matches the month-end(s) when the changes were incorporated.
 - b. Trace the revised budget on the approved baseline change documentation to the control account reports, and then trace upward to the reporting level in the IPMR/CPR.
 - c. The reported BAC in the IPMR/CPR must match the adjusted BAC at the reporting level.
 - d. Document all discrepancies as compliance concerns

3. Verify project modifications are incorporated per the process.
 - a. Review the contract and select three contract modifications that added work scope.
 - b. Select these from the last twelve periods of data.
 - c. Review the CBB log to determine when these modifications were approved as a baseline change and incorporated into the baseline.
 1. X = # contract modifications which add/revise scope that are not incorporated into the PMB in accordance with the System Description
 2. Pass: X = 0
 3. Fail: X > 0

4. Confirm that the reviewed project modifications are reflected in the IMS.
 - a. For the same modifications, review the IMS for the same periods to determine if the work scope changes modified the baseline IMS dates as either new activities or modified existing activities.
 1. X = # contract modifications which add/revise scope that are not incorporated into the IMS in accordance with the System Description
 2. Pass: X = 0
 3. Fail: X > 0

Interview Questions

None

28.A.2 Is UB distributed to or removed from Control Accounts or Summary Level Planning Packages as soon as practicable, but not later than two accounting periods after the DOE approved change document?

Discussion

UB is budget that is applicable to specific contractual effort that has not yet been distributed to CAs or Summary Level PPs (SLPPs). Identification of the project’s UB, facilitates project management’s ability to account for and report on all authorized scope and budget. UB is a holding account for new authorized work or AUW. Once a DOE approved change document has been approved, the UB budget and scope must be distributed to CAs and/or SLPPs no later than two full accounting periods.

For unpriced change orders (Authorized Unpriced Work (AUW)), the contractor's best estimate of the cost of the new work scope is developed for planning and budgeting purposes. This value is used to establish initial budgets in the PMB. Until the scope can be definitized and priced, scope and budget for near term effort are established in CAs with the remaining scope and budget held in UB until negotiations are complete. After definitization, the scope and budget remaining in UB will be planned and budgeted in CAs and/or SLPPs as soon as practical, typically within 60 working days, but no later than two full accounting periods after the baseline change documentation is approved (also see Guideline 14).

UB may also contain scope removed from the distributed baseline. If the government issues a stop work order or DOE required scope reductions, the work must be immediately stopped with the budget associated with the budgeted cost of remaining work returned to UB to await final definitization and removal from the contract/project. This is required within one full accounting period after the stop work order is received to keep project scope and time phased PMB in synch. It is removed from UB within one month after the baseline change documentation approval taking the scope out of the project for the work stopped.

Impact of Noncompliance

Failure to distribute scope and budget in a timely manner after a stop work order may result in delays in detailed planning and work execution. Failure to reclaim budget (in the event of a stop work) in a timely manner may result in work being performed after a stop work order has been issued.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Confirm the SD addresses the timely incorporation of UB; not later than two accounting periods after the DOE approved change document is received.
 - a. Review the EVM SD.
 - b. Verify the document clearly states the requirement for timely distribution from UB and subsequent incorporation of the definitized scope and budget to be no later than two full accounting periods.
 - c. Document all discrepancies as compliance concerns
2. Confirm the timely incorporation of UB, no later than two accounting periods after the DOE approved change document is received.
 - a. Review the CBB log and select up to three transactions that changed PMB.
 - b. Select these from the last twelve periods' data.

- c. Review the CBB log and contract modifications, BCPs, SOWs, WADs, the IMS and CAPs to determine when these were definitized by contractual action and incorporated into the baseline
 1. $X = \$ \text{ value of Format 1 UB not distributed within timeframe in accordance with the SD}$
 2. Pass: $X = 0$
 3. Fail: $X > 0$

Interview Questions

1. Project Controls: How often to you review the balance of UB remaining?

28.A.3 Does the contractor incorporate authorized changes into the IMS, EVM Cost Tool, CBB Log, and Work Authorization in the same accounting period?

Discussion

Authorized changes are incorporated into baseline documents, such as schedules, budgets, work authorization documents, and other project documentation as needed to properly reflect the new work scope. This provides performance measurement data that accurately reflects the status of all currently authorized work and ensures an integrated baseline. The intent of this QE LOI is to ensure all baseline documents (work scope, schedule, and budget) are in agreement with the change authorized on the internal baseline change document, are compliant with the contract change and are all updated during the same accounting period. Authorized changes must be incorporated in all appropriate baseline documents within the same period to keep project scope and time phased PMB in synch.

Impact of Noncompliance

Failure to incorporate authorized changes in the appropriate baseline documents will result in a baseline that is no longer integrated, which result in unauthorized work being performed, or authorized work not being performed.

Verification Steps

Data Analysis (Automatable)

None

Artifact Trace between documents

1. Verify the process mandates updating baseline documents within the same accounting period.
 - a. Review the EVM SD.

- b. Confirm the document clearly states the requirement to update baseline documents, all within the same accounting period.
 - c. Verify the document listing and the approval authority.
 - d. Document all discrepancies as compliance concerns
2. Per the process, confirm baseline documents are updated after internal (external if required) baseline change documentation approval.
 - a. Review the CBB log and select ten approved baseline change documents. Select these from the last twelve periods' data.
 - b. Review the baseline change documents to determine if any of the following baseline documents should have been modified: WBS, WBS Dictionary, work authorization documents (WADS), IMS, RAM, subcontracts/purchase orders, control account/WP plans, EVM Cost Tool, and/or other baseline documents as specified by the EVM SD.
 - c. Review the appropriate documents to determine if and when they were modified after the baseline change document approval.
 - d. Confirm the documents subsequently approved by the correct authority were updated within the same accounting period.
 - e. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: After a baseline change document (BCP, BCR, etc.) has been approved, what other baseline documents must be amended, and which ones are you responsible for amending?
2. Project Controls: After a baseline change document (BCP, BCR, etc.) has been approved, what other baseline documents must be amended, and which ones are you responsible for amending? How do you follow up to ensure that all baseline documents have been amended in the same accounting period?

28.A.4 When implementing external changes, does the CAM use realistic resource requirements for the scope of work?

Discussion

Timely incorporation of authorized changes means the budgets for newly authorized work are based on the most current requirements for the work effort. Subsequent to final contract negotiations, the contractor plans the budgets in detail, according to the newly defined work scope and definitized cost. These budgets must be based on a current estimate of the required resources, in order to ensure a realistic baseline. Additionally, contractual changes and the subsequent budgets must contain the most current rates as proposed to or approved by the cognizant Contracting Officer for planning purposes.

Impact of Noncompliance

Failure to base budgets for authorized changes on current resource requirements and current rates will result in a baseline that is unrealistic or unachievable.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Confirm the baseline changes for new scope have resource plans supported by a basis of estimate.
 - a. Review the CBB log and select ten approved baseline change proposals/requests.
 - b. Select these from the last twelve periods of data.
 - c. Review the supporting basis of estimate for each baseline change and compare to the final approved budget for the change. Note the date of the estimate and compare to the date of the baseline approval.
 - d. Verify there is no significant difference in either the date or the budget.
 - e. Document all discrepancies as compliance concerns

Interview Questions

1. CAM:
 - a. How do you prepare a resource estimate when developing a proposed baseline change?
 - b. Have any internal baseline change proposal/request approvals resulted in a reduced budget, and how did you make any adjustments?
2. Project Controls:
 - a. How do you ensure that the most current rates are used by the CAMs when preparing baseline change documentation?
 - b. How do you ensure that the most current rates are applied in the EVM Cost Tool when the approved baseline change is incorporated?

28.A.5 Are PMB changes consistent with any funding restrictions?

Discussion

Project scope and total budgets are not constrained by funding. Budget versus funding is a key concept as it relates to earned value. For example guideline 6 requires a critical path over the duration of the authorized project. Yet funding limitations, if any, may impact the time phasing of the budget, and can impact the EAC as work is pushed in out years. See QE LOI 3.A.3 for a discussion of funding anomalies that may impact PMB.

Guideline 8 discusses the intent of the PMB is an executable baseline. This is where funding and EVMS may intersect. The time phasing of the PMB should be consistent with the funding constraints, if any. As funding changes, the PMB is reviewed for impact and modified if required. The EAC always reflects the impact, if any, of funding changes.

Impact of Noncompliance

When the PMB exceeds the authorized funding, the resulting plan is unachievable.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm the contract documentation funding authorizations are supported by the resource plans for the current PMB.
 - a. Review the CBB log and select up to three approved baseline change requests for scope changes to the PMB.
 - b. Select these from the last twelve periods' data.
 - c. Compare the time phasing of the change to the duration as stated in the funding limitation, if specified for the change.
 - d. Obtain the total time phased PMB as of month-end when the changes were incorporated, and verify that the phasing does not exceed the funding limitations specified in the contract.
 - e. Document all discrepancies as compliance concerns

Interview Questions

None

28.B Subsection - Authorized Unpriced Work

Discussion

There are times when the contractor and DOE agree additional scope is necessary to accomplish the project objectives. This is scope that was not in the original work statement, but is now understood to be required. It may be that the work must be started immediately, preceding negotiations to definitize the final budget. Authorized unpriced work (AUW) accommodates this need and provides a controlled process to allow work to begin and negotiations to follow. While UB distributions to accommodate AUW in the near term may be limited by the “Not to Exceed” (NTE) funding authorizations, the full estimate for AUW should be placed in UB at the time the AUW is authorized until distributed.

The guideline is further defined by QE LOI shown below.

28.B.1	Is AUW incorporated into the PMB at the estimated value of the full authorized scope regardless of any “Not To Exceed” (NTE) spending limitation?
28.B.2	Has a portion of the AUW been detail planned for the near term at the value estimated to be performed for the near term scope?

QE LOIs Repeated With Discussions

28.B.1 Is AUW incorporated into the PMB at the estimated value of the full authorized scope regardless of any “Not To Exceed” (NTE) spending limitation?

Discussion

AUW must be incorporated into the PMB at its estimated value for the entire work scope and therefore not be limited to a contractual funding limitation such as a Not to Exceed (NTE). Since these funding limitations are typically at 50% or at some amount less than the anticipated total value of the effort, it is simply a partial amount to encourage negotiations. The entire estimate for the newly authorized work scope is then placed into UB. The contractor should then distribute only the amount of budget necessary for near term work until the entire effort can be definitized. Once definitization has occurred, the AUW can then be more easily adjusted to the negotiated amount, and then the net amount distributed to CAs and SLPPs (see Guideline 28.B.2).

The contractor determines the full value of the change to incorporate into the baseline from one of several sources. This number is provided to DOE before implementation. As the estimate matures, the revised forecast is reconciled with the remaining UB budget as applicable. In order of preference the sources could be

1. A number with full scope provided by DOE. This does not include an NTE that is not based on the total scope.

2. A proposal with Certified Cost and Pricing.
3. Any written proposal
4. A Rough – Order – Of – Magnitude (ROM) estimate

Impact of Noncompliance

Failure to incorporate the full, estimated budget for all newly authorized work results in a baseline that does not fully represent the work scope of the changed contract.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between documents

1. Confirm the full amount of the AUW estimate has been placed in UB.
 - a. Review the CBB log for the past twelve months for any authorized changes involving AUW.
 - b. Review the DOE email or change document authorizing the AUW. Did it have an NTE amount? If so review the amount in the UB/CBB log and verify the amount is significantly different than the NTE.

Interview Questions

1. Project Controls: For AUW, how do you ensure the entire estimate is placed in UB, regardless of an NTE?
2. Project Controls: What is the basis for the amount placed in UB/CBB logs for AUW?

28.B.2 Has a portion of the AUW been detail planned for the near term at the value estimated to be performed for the near term scope?

Discussion

The changes to the CBB in the form of Authorized Unpriced Work (AUW) must accurately identify all authorized scope on contract. AUW scope and associated budgets are identified without the constraint of funding or Not to Exceed (NTE) limitations, but are related to the value of the proposal. Just as incrementally funded contracts should establish a CBB for the entire scope of work, the budget established for AUW must represent all authorized scope. The contractor responds to the AUW authorization by placing the near-term budget into the applicable CAs and the remainder in undistributed budget until negotiation and incorporation into the contract (and removal from AUW). After

definitization of a contract modification, any A UW budget remaining in UB is allocated appropriately, i.e., either planned and budgeted into control account(s), SLPP(s), or MR as soon as practical or removed from the CBB.

Impact of Noncompliance

Failure to observe funding limitations for near term work may result in allowing expenditures to accrue in excess of the NTE value set by the contracting action, thus requiring additional contractual action to either add funding or make other adjustments.

Verification Steps

Data Analysis (Automatable)

None

Artifacts Traces between documents

1. Confirm the value of budget distributed from UB and compare it to the NTE value.
 - a. Review the CBB log and select up to three approved baseline change requests for A UW changes.
 - b. Review the backup from the select change documents.
 - i. Did the amount of near term work get planned. Should typically have several months planned beginning the full month after the change.

Interview Questions

None

Guideline 28 – Revisions Typical Artifacts Common to the QE LOIs

- System Description
- Contractual Work Breakdown Structure Dictionary
- Contractual Documents
- Control Account Plan
- Work Authorization Documents
- Baseline Integrated Master Schedule
- Contract Budget Base Logs (UB, MR, PMB, etc.)
- Baseline Change Control Logs
- Contract WBS
- Baseline Change Requests and supporting detail
- IPMR/CPR
- Responsibility Assignment Matrix
- Subcontracts/purchase orders
- Proposal
- NTE authorization letters
- FPRP/FPRA

Guideline 29 – Maintain Baseline and Reconcile Budgets

Reconcile current budgets to prior budgets in terms of changes to the authorized work and internal replanning in the detail needed by management for effective control.

This guideline is organized into four categories for further understanding:

- Freeze Period Restrictions
- Change Reconciliation Content
- Changes to Open WPs
- Logs

WP Freeze Period Restrictions – Defines the freeze period and describes the requirements to minimize and control baseline changes within the freeze period.

Change Reconciliation Content – Maintain Baseline and Reconcile Budget – Describes the requirements for maintaining the budget baseline traceability and restrictions for MR.

Changes to Open WPs – Describes the requirements to minimize and control changes to open WPs.

Logs – Describes the requirements to maintain the Project's budget logs (CBB, MR, UB, Change Control (BCR), etc., as applicable)

29.A Subsection - Freeze Period Definition and Restrictions

A freeze period is a period of time from time now to a point in the future where changes are not permitted (except for a few conditions such as the correction of errors, rate adjustments, customer or management approved actions and safety, emergency, or critical issues) This restricted period encourages detailed control account planning to be in place beyond the freeze period to facilitate efficient execution of the near term work scope and to allow valid performance measurement.

The guideline is further defined by QE LOI shown below.

29.A.1	Is the freeze period defined as no less than the current accounting period plus one period, and is it consistently applied?
29.A.2	Are baseline changes that are defined and implemented within the freeze period limited to definitization or authorization of customer-approved actions, economic price adjustments, correction of BCWS reporting errors, DOE recognized safety or emergency issues, or time critical issues where the need for the baseline change has only recently been discovered?
29.A.3	Are the following items included in baseline change approval documentation: Baseline schedule and cost before and after changes by EOC, changes to Baseline schedules logic/durations, impacts to Earned Value Techniques, and baseline budget before and after changes by EOC?

QE LOIs Repeated With Discussions

29.A.1 Is the freeze period defined as no less than the current accounting period plus one period, and is it consistently applied?

Discussion

The freeze period is a term used to indicate a restrictive period for baseline changes. It must be defined as a minimum as the current accounting period plus the next accounting period. Several definitions are crucial to understanding this concept. Typically, contractors will follow an accounting calendar rather than the monthly calendar so the freeze period is referenced in terms of the calendar used for EVMS. Contractors will use this accounting calendar for all aspects of EVM planning, execution, and reporting. The intent of the freeze period is that there must be no ability to perform the work and then adjust the budget time phasing based on actual performance in order to mask variances. Baseline changes are highly restricted during this defined freeze period in order to maintain a stable and measurable work plan for ongoing work. (See 29.C.2.)

The freeze period is flexible and will generally be within two reporting periods. At the beginning of the month it is the longest and the end of the month the shortest. It rotates at the contractor accounting calendar month-end date to the next following month-

end. Again, it must be defined as a minimum as the current accounting period and the next period.

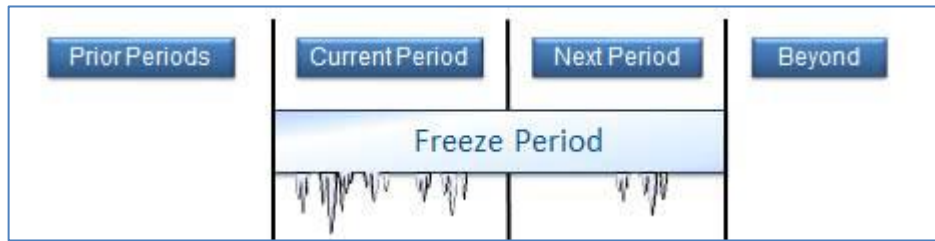


Figure 17 - Freeze Period Example

Impact

Frequent, continuing, or unallowable adjustments to the baseline within the freeze period will result in the lack of insight into true performance variances and the potential for actual cost mischarging.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm process documents define a freeze period.
 - a. Review the contractor's EVM SD.
 - b. Verify there is a clear description of the freeze period, defining it as current accounting period plus next period, at a minimum.
 - c. Confirm there is a clear definition of allowable and unallowable baseline changes within the freeze period.
 - d. Verify there is clearly stated guidance on the preparation, coordination, and approval process.
 - e. Document all discrepancies as compliance concerns

Interview Questions

1. Project Controls: How do you review baseline change requests that contain proposed changes within the freeze period?

29.A.2 Are baseline changes that are defined and implemented within the freeze period limited to definitization or authorization of customer-approved actions, economic price adjustments, correction of BCWS reporting errors, DOE recognized safety or emergency issues, or time critical issues where the need for the baseline change has only recently been discovered?

Discussion

Baseline and accounting changes are highly restricted during the defined freeze period in order to maintain a stable work plan for ongoing work, allow meaningful variances, and to ensure that planned resources will be available as scheduled. Changes are limited to:

- Routine accounting adjustments, such as inclusion of estimated actuals;
- Customer approved actions, such as definitization of previously awarded but undefinitized work, or newly authorized work that must begin within the freeze period;
- UB (directed changes and correction of errors)
- MR scope based changes
- Routine rate changes, such as recognition of the final billing rates for the current year;
- Economic price adjustments, such as adjustments for inflation on the project;
- Correction of errors, such as correcting over reporting of BCWP, planning errors, correction of timekeeping errors, etc.; or,
- DOE recognized safety or emergency issues, which must be budgeted for work to immediately commence. (Management approved actions).

The IPMR/CPR Format 5 must identify the reasons for MR transactions and these must agree with the reasons provided in the suppliers change control documentation. Review freeze period budget change documents to ensure adherence to the process. Verify cost and schedule explanation of impacts to the IMS and CBB are documented. Compare all documentation to ensure internal changes match what is reported to the Government.

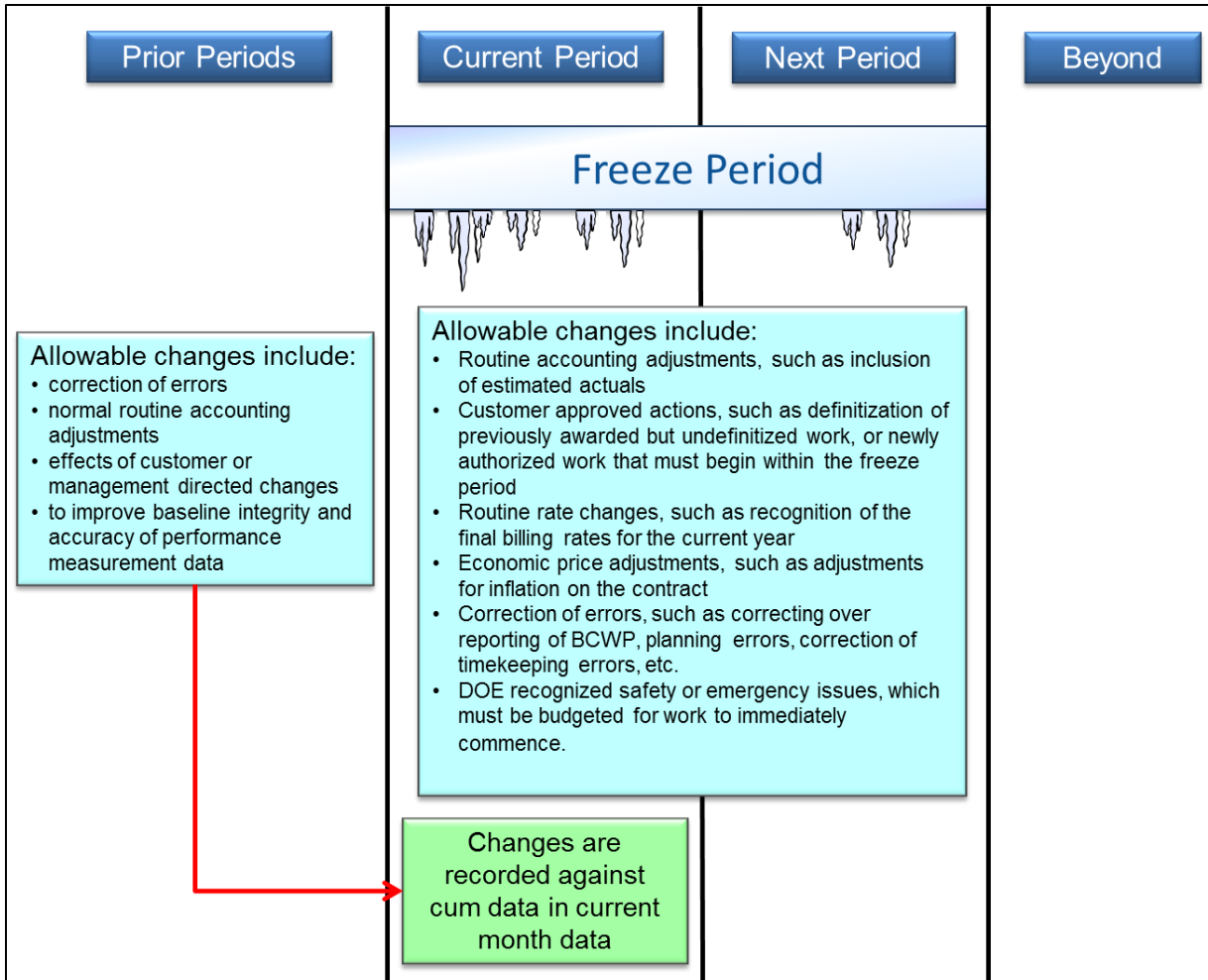


Figure 18 - Freeze Period Changes

Impact of Noncompliance

Frequent or continuing adjustments to the baseline or accounting data within the freeze period may result in the lack of insight into true performance variances and the potential for actual cost mischarging.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify process documentation provides guidance on changes allowed during the freeze period.

- a. Review the contractor's EVM SD.
 1. Does it contain a clear description of allowable and unallowable baseline changes within the freeze period, limited to the changes described above?
 2. Is there a clear definition of the preparation, coordination, and approval process?
Document all discrepancies as compliance concerns
2. Verify freeze period changes are appropriate and documented in the IPMR/CPR Format 5.
 - a. Perform a manual check of changes in the freeze period to ensure compliance and process adherence. Review approved baseline change requests that were approved during the period from twelve to three months ago, and select six that had baseline changes in the freeze period.
 - b. $X = \#$ of changes checked that are not in accordance with contractor's defined process
Pass: $X = 0$
Fail: $X > 0$
3. Review IPMR/CPR Format 5 to determine if the freeze period changes were documented.
 - a. Document all discrepancies as compliance concerns

Interview Questions

None

29.A.3 Are the following items included in baseline change approval documentation: Baseline schedule and cost before and after changes by EOC, changes to Baseline schedules logic/durations, impacts to Earned Value Techniques, and baseline budget before and after changes by EOC?

Discussion

Documentation for any baseline change must include all relevant items that impact the baseline planning. The source documents may vary between contractors depending on their EVM systems, but will include:

- Baseline schedule durations (baseline start and finish dates);
- Baseline schedule links, showing any updated or new logic;
- Earned value techniques for new WPs;
- Proposed new earned value technique process for changing WPs before and after EVT is revised;
- Baseline budgets by element of cost;
- Baseline rates used for planning (may refer to date and name of approved set)
- Justification for proposed baseline changes within freeze period

Note that the contractor's system may also require submission of any proposed QBD as back up for the earned value technique. When a change is required from one budgeted element of cost to another, the change is driven by either a change in the work scope or how the work will be performed. For example, work was previously budgeted as labor, meaning it would be performed by in house (prime contractor) labor resources. If the work were now being performed by a subcontractor, the budget element must change from labor to subcontract/material. In all cases, this represents a change in the work scope and how it will be done, and must be approved and documented in a baseline change request.

Additionally, the earned value technique (EVT) may not be changed in an open WP where direct costs have already been incurred unless the EVT chosen was proven to be a planning error. The preferred method is to close the existing open WP by setting cum BCWS and BAC equal to cum BCWP and planning a new WP with the different technique. Again, ACWP is not changed when the existing WP is closed, and any CV will remain with the closed WP.

If the preferred method for revising the EVT by closing the existing WP and opening a new one is not used and the contractor chooses to revise the existing WP, then the contractor must:

- 1) Adjust the cumulative BCWP for performance using the new EVT. The issue here is the percent complete could change using a different EVT. This includes QBDs, if applicable.
- 2) Update the IMS and the EV Cost Tool.
- 3) Provide the justification and documentation for changing the EVTs in open WPs in the IPMR/CPR Format 5.

Impact of Noncompliance

Failure to properly document the supporting details for proposed baseline changes invalidates the integrity of the PMB.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify process documentation includes baseline change documentation parameters.
 - a. Review the contractor's EVM SD.
 - b. Verify the documentation contains a clear description of the requirement to include the items listed above, plus others as appropriate, in the baseline approval documentation.

- c. Verify there is a clear description of the requirement to approve baseline changes if the baseline element of cost(s) needs to be changed.
 - d. Document all discrepancies as compliance concerns
2. Review approved baseline change requests that were approved during the last six periods, and select six.
 - a. Confirm this documentation refers to changes in work scope or the means in which the work will be performed (i.e., in house vs. subcontractor).
 - b. Review the supporting documentation for the BCR for compliance against the contractor's EVM SD.
 - c. $X = \#$ of changes checked that are not in accordance with contractor's defined process
 - d. Pass: $X = 0$
 - e. Fail: $X > 0$
 3. Review approved BCRs for the last twelve months to determine if any included a change in earned value technique (EVT). If so, verify the changes resulted in one of the two following actions:
 - a. The existing WP was closed (setting $BCWS_{cum}$ and BAC equal to $BCWP_{cum}$, keeping the cost variance) and a new WP was opened and planned using the new EVT (preferred method), or
 - b. The existing WP EVT was revised by justifying the change because of an error, recalculating BCWP new cum-to-date percent complete with the new EVT and new documented QBDs, verifying the schedule was updated reflecting the EVT change and impact to the schedule data, and reviewing and justifying the new time phased budget data (if applicable).
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

29.B Subsection - Change Reconciliation Content

Following a controlled and consistent change process is vital to maintaining accurate EVM reporting. The integration of scope, schedule and budget during the change process is crucial to baseline integrity. The change process requires there be a clear understanding of what is being changed and reconciliation between the current plan and the revised plan facilitates this understanding. Project documentation such as work authorizations, schedules, and project logs provides and demonstrates this reconciliation.

The guideline is further defined by QE LOI shown below.

29.B.1	Are the revised schedules and budgets resulting from authorized baseline changes traceable to the prior schedules and budgets?
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29.B.2	Are internal changes fully authorized consistent with the contractors change control/SD process?
29.B.3	If the proposed change involves UB, does the change reconcile with the transfer to or from CAs or SLPPs?
29.B.4	Does the contractor limit the use of Management Reserve (MR) to use within project scope and out of scope control account changes; indirect rate changes, changes to planning assumptions; make/buy decisions, or subcontractor original negotiations?
29.B.5	Are logs and change control documentation maintained to show each MR transaction, approvals, and justifications?
29.B.6	Are scope, schedule, and budget always planned or transferred together when changes are made?

QE LOIs Repeated With Discussions

29.B.1 Are the revised schedules and budgets resulting from authorized baseline changes traceable to the prior schedules and budgets?

Discussion

It may be necessary to perform internal replanning actions within scope of the authorized contract (CBB or Total Allocated Budget (TAB)) to compensate for cost, schedule, and technical problems which have caused the original plan to become unrealistic; or which require a reorganization of work or people to increase efficiency of operations; or which require different engineering or manufacturing approaches. Internal replanning is intended to maintain an executable baseline for the remaining in-scope work on the contract.

Current budgets and schedules must reflect the current levels of authorized work and be based on resources needed to complete that work. The budgets must be traceable to original authorized budgets and scope. Schedules must support the project milestones and deliverables. The ability to track budget values and schedules for both internal and external changes is necessary to properly maintain the CBB from contract start to completion. This also ensures that the CBB maintains a traceable relationship to the contract. As changes are made to the contract, the CBB must be adjusted by the amount of change in order for the communication between the DOE and contractor to remain valid.

Impact of Noncompliance

Inability to trace the changes leading to the current budget baseline results in a lack of confidence that the baseline changes were properly authorized and implemented, leading to a lack of confidence in the validity of the baseline.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm that the BAC reconciles with approved budget changes.
 - a. Review the CBB log to identify which control account budgets were revised during the current period.
 - b. For each control account, sum the value of the BAC from the prior period (from the EVM Cost Tool output) plus the value of the approved BAC change as shown in the log.
 - c. Compare that sum to the current budget shown for the control account in the EVM Cost Tool. The numbers must equal. Count the number of CAs where this comparison is not equal to zero.
 3. $X = \# \text{ of CAs where } ((\text{Prior period CA BAC} + \text{Sum (current period changes to CA BAC)}) - \text{Current period CA BAC}) \neq 0 = \text{total \# CAs}$
 4. Pass: $X = 0$
 5. Fail: $X = >0$
2. Confirm the IMS supports the authorized baseline changes.
 - a. Review the IMS PoP for the applicable activities that support the work scope that was changed by the authorized change.
 1. Confirm that activity baseline start and finish dates support any changes in the PoP.
 2. If the IMS is resource loaded, confirm the changes are reflected in the resource allocation.
 3. Document all discrepancies as compliance concerns

Interview Questions

None

29.B.2 Are internal changes fully authorized consistent with the contractors change control/SD process?

Discussion

Internal changes are those changes to the baseline where the total baseline budget is not affected. Examples of these type of changes include, but are not limited to, replanning and/or rephasing of existing WP budgets, rolling wave conversion, application of MR for work that is new to the control account, etc. The contractor must establish an internal process for the preparation, review, and approval of baseline changes. Typically,

these changes are prepared on a baseline change request (BCR) and requested by the CAM and go through an approval cycle prior for incorporation into the baseline. This process must be followed consistently in order to ensure only fully authorized changes are made to the baseline.

Internal replanning should not be used as an alternative to proper initial planning, nor should it be used to mask legitimate variances.

Impact of Noncompliance

Failure to follow the established process results in unauthorized baseline changes and also the potential for out of scope work or unauthorized expenditures and/or unallowable costs.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm the process for baseline change revisions.
 - a. Review the EVM SD.
 - b. Verify the document clearly defines the process for the preparation, review, and approval of internal baseline changes.
 - c. Confirm the document clearly defines the approving authority.
 - d. Document all discrepancies as compliance concerns

2. Verify baseline changes are reviewed, approved, and documented.
 - a. Select ten BCRs from the CBB log over the last six periods and review the approved BCR.
 - b. Confirm that the correct authority (per the SD) approved the BCR.
 - c. Verify the appropriate personnel, e.g., CAM, project control, scheduler, etc., also coordinated on the BCR prior to final approval.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

29.B.3 If the proposed change involves UB, does the change reconcile with the transfer to or from CAs, SLPPs, or MR?

Discussion

As UB is a temporary holding account for work scope and budget, any baseline change that involves a transaction from UB to CAs and/or SLPPs or vice versa must be offset by a reverse change to the affected accounts. For example, if a change was

recorded to UB to move \$1M to the distributed budget, UB would be decremented by \$1M, and the distributed budget would be incremented by \$1M. The sum of the budget changes to the CAs/PPs or MR must always be equal to the amount distributed from UB. These offsetting entries would be recorded in the CBB log against the appropriate budget elements (see 29.E).

Most changes will involve movement from UB, but there may be occasions when budget (and the corresponding work scope) is moved from the CAs/WPs into UB. This is typically done during major re-baselining, movement across CAs, between CAMs, or during stop work situations. UB may never be negative.

Impact of Noncompliance

Failure to record offsetting and equal entries against UB and the distributed budget will result in erroneous values for the budgets and an inaccurate baseline.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Per the process, confirm the timely distribution of UB.
 - a. Review the Project's budget logs (CBB, UB, MR, etc.) to identify UB transactions over the past six periods.
 - b. Determine when the budget was placed into UB, and then when it was distributed.
 - c. Compare this to the maximum time allowed in the SD. (Note: exceptions should be made for budget that is still undefinitized that may remain in UB until definitized)
 1. $X = \$$ value of Format 1 UB not distributed within timeframe in accordance with the SD
Pass: $X = 0$
Fail: $X > 0$
2. Verify UB transactions are supported by BCRs.
 - a. Review the Project's budget logs (CBB, UB, MR, etc.) to identify UB transactions from UB to CAs over the past six periods.
 1. Confirm each transaction is properly supported by an approved BCR.
 2. Verify each transaction that distributes UB has an opposite transaction that adds budget to one or more CAs in the distributed budget.
 3. Review the supporting BCRs for compliance with the System Description.
 4. Document all discrepancies as compliance concerns
3. Verify movement of budget and work from CAs into UB

- a. Review the CBB log to identify any transfer from control account budgets into UB.
 1. Confirm each transaction is properly supported by any approved BCR and that the corresponding work is also being transferred.
 2. Verify each transaction has a corresponding decrease in the distributed budget by control account.
 3. Document all discrepancies as compliance concerns
4. Verify the value of UB is not negative.
 - a. $X = \$ \text{ value of IPMR/CPR Format 1 UB}$
Pass: $X \Rightarrow \$0$
Fail: $X < 0$

Interview Questions

None

29.B.4 Does the contractor limit the use of Management Reserve (MR) to use within project scope and out of scope control account changes; indirect rate changes, changes to planning assumptions; make/buy decisions, or subcontractor original negotiations?

Discussion

While the contractor system may specify restrictions on the use of MR, there are general principles that must be observed. MR is used for only new work that is within scope of the project, but is out of scope to the control account. These situations typically arise when risk has been realized, resulting in new work that must be performed in order to meet the terms of the project. This new work may be the result of a change in a make/buy decision and/or the project execution strategy. Other circumstances include risk and opportunity handling, work needing to be repeated, and changes to future budgets for work that has not yet begun. A test for whether MR may be allocated to the control account is determined if the work description for the account needs to be revised and the work is within scope of the project. MR may also be allocated for significant indirect rate changes, changes to planning assumptions, make/buy changes, or subcontractor original negotiations but not for later Request for Equitable Adjustments (REAs). Current indirect rates are used for changes to future work and are reconcilable to the prior indirect rates incorporated in the Performance Measurement Baseline (PMB).

MR is never used to offset or zero out variances, for either cum-to-date or projected variances. Additionally, MR is not used for work that is out of scope to the project. MR is never negative.

Impact of Noncompliance

Violating the prohibition against applying MR to existing work within the CAs will result in elimination or distortion of performance variances, severely curtailing

management's ability to identify and correct performance issues and/or estimate project completion cost and/or date.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm MR values reconcile between internal and external reporting.
 - a. Review the IPMR/CPR from the prior reporting period. Take the reported value of MR, and then add the sum of all MR changes for the current reporting period from the project's budget logs (CBB, UB, MR etc.) log. Compare this to the reported MR value in the IPMR/CPR for the current reporting period.
 1. $X = (\$ \text{ value of previous period Format 1 MR} + \text{Sum (all current period MR changes from log)}) - \text{current Format 1 MR}$
Pass: $X = 0$
Fail: $X \neq 0$
2. Verify MR values reconcile between external reporting and the baseline change log value
 - a. Compare the values for MR in the IPMR/CPR (last reporting period) to the value of MR in the project's budget logs (CBB, MR, UB, etc.) log (as of the last reporting period).
 1. $X = \text{Format 1 MR} - \text{project budget logs (CBB, MR, UB, etc.)}$
Pass: $X = 0$
Fail: $X \neq 0$
3. Confirm each MR transaction has a corresponding BCR.
 - a. Review the CBB log to identify MR transactions over the past six periods.
 - b. Verify each transaction is properly supported by an approved BCR.
 - c. Review the supporting BCRs for compliance with the System Description.
 1. $X = \# \text{ of Format 1 MR transactions not in accordance with System Description allowed reasons}$
Pass: $X = 0$
Fail: $X \neq 0$
4. Confirm MR value is not negative.
 - a. Review the IPMR/CPR for the past six periods.
 1. $X = \$ \text{ value of IPMR/CPR Format 1 MR}$
Pass: $X \geq \$0$
Fail: $X < \$0$

Interview Questions

None

29.B.5 Are logs and change control documentation maintained to show each MR transaction, approvals, and justifications?

Discussion

Maintaining exact records of MR usage is vital to ensuring that the MR budget is not over allocated. These records are normally maintained in a project budget logs such as a CBB log and an MR log. The transactions must show the allocation from MR to specific CAs, the amount, approval date, and a tracking number for the approved baseline change request. A running balance of the MR budget is maintained, and as a minimum, the month-end value must be reflected in the log and reconcilable with the MR balance on the BCP log and project budget CBB log. Each transaction must be traceable to an approved baseline change request for supporting documentation. Note: there is no requirement to have more than a CBB log that includes columns for UB, MR, PMB etc.,) but if there are more project budget logs, they must reconcile to the CBB log.

Impact of Noncompliance

Failure to maintain a current balance for the MR budget may result in over allocation of MR and deprives the project manager of the necessary insight to manage the overall baseline and approve changes as necessary.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm MR changes are traceable from the log to the BCR.
 - a. Review the MR changes from the Project's logs (CBB, MR, etc.).
 - b. Verify that the log(s) show the allocation to/from the MR account, the amount, approval date, and a tracking number for the BCR.
 - c. Confirm the supporting MR log (if used) contains the same values as shown in the CBB log.
 - d. Verify that the month-end value is reflected in the log as a minimum
 - e. Document all discrepancies as compliance concerns

Interview Questions

None

29.B.6 Are scope, schedule, and budget always planned or transferred together when changes are made?

Discussion

For baseline integrity, changes are controlled and understood in terms of their impact on scope, schedule, and budget. Current budgets must reflect current levels of authorized work based on resources needed to complete that work and must be traceable to original authorized budgets and scope. On a project level, documents to be reviewed to ensure the integration of scope, schedule and budget changes include change control logs, BCPs, WBS and WBS Dictionary, PSW, RAM, WADs, IMS, CAPs, undistributed budget justification, MR justification, and project logs.

Impact of Noncompliance

Unless scope, schedule, and budget are integrated, and controlled, the calculation of accurate earned value is not possible.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Per the process, confirm scope, schedule and budget are consistently moved together.
 - a. Review the CBB log and select ten approved baseline change proposals (BCPs). Select these from the past six periods.
 - b. Review the BCPs to determine if any of the following baseline documents should have been modified: WBS, WBS Dictionary, PSW, WADs, IMS, RAM, subcontracts/purchase orders, control account/WP plans, or other baseline documents as specified by the EVM SD.
 - c. Review the appropriate documents to determine if scope, schedule and budget changes are consistent.
 - d. Document all discrepancies as compliance concerns
2. Subsequent to authorized revisions, confirm schedule and budget integration at the project and reporting level.
 - a. Review the CBB log and select one accounting period of approved baseline change requests. Select this from the past six periods.
 - b. Based on changes for one period, use the project documents to verify reporting at the project level.
 1. Confirm the IMS baseline start/finishes match the project PoP.
 2. Verify the CA level work authorization document budgets match IPT or summary level work authorization documents, if used.
 3. Confirm that the CBB log totals have been properly updated for the period. Confirm that the total of the budget changes on the BCPs for the selected month totals the change reflected in the distributed budget total on the CBB log.

- c. Document all discrepancies as compliance concerns

Interview Questions

None

29.C Subsection - Changes to Open WPs

Changes may impact work scope currently being executed. While changes to open WPs are permitted under specific conditions, it is important to follow a controlled process to ensure the previously reported EVM data is not compromised. In order to further control near term changes, freeze period restrictions may limit changes to open WPs.

The guideline is further defined by QE LOI shown below.

29.C.1	Are changes to BCWS in open WPs beyond the freeze period limited to time phasing the existing budget?
29.C.2	Are open LOE Work Packages with insignificant cumulative ACWP reviewed for purposes of preventing false variance reporting?

QE LOIs Repeated With Discussions

29.C.1. Are changes to BCWS in open WPs beyond the freeze period limited to time phasing the existing budget?

Discussion

The only permissible change to open WPs is a change in the time phasing of the existing budget beyond the freeze period without DOE approval/direction. This is to ensure baseline stability and a continuing valid measurement of reported BCWP.

When new scope-related changes drive a change to an open WP, the preferred method is the WP must be closed by setting cum BCWS equal to cum BCWP. A new WP would then be planned with the revised scope and budget. ACWP is not changed when the existing WP is closed, and any CV will remain with the closed WP.

If the preferred method for implementing new scope is not used and the contractor chooses to revise the existing WP, then the contractor must: 1) Add the additional budget using current rates

- 2) Update the IMS and link/relink activities as required and realistic
- 3) Adjust cumulative BCWP for performance within the earned value technique. The issue is that the BAC has changed, so the prior cumulative percent complete will change the current BCWP. This includes QBDS, if applicable.
- 4) Provide justification and documentation for changing open WPs in the IPMR/CPR Format 5.

Impact of Noncompliance

Failure to have effective baseline controls in place for open WPs will result in an unstable baseline, unauthorized changes, and lack of insight into the true performance of the project.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify there are no changes to BAC of open WPs by reviewing the WP data in the EVM Cost Tool output.
 - a. $X = \$ \text{Value of BAC for WPs where cum ACWP} > 0$ and current month BAC does not equal previous month BAC. Note: exclude overhead and allocation roll-up accounts/WPs.
 - b. Pass: $X = 0$
 - c. Fail: $X <> 0$
2. Review the CBB log for the past twelve months for any changes to open WPs. Review the baseline change request and supporting details to ensure that the only change was to the time phasing of budget beyond the freeze period. Review the IMS to ensure that the corresponding change was made to the baseline dates and duration as appropriate.

Interview Questions

None

29.C.2 Are open LOE Work Packages with insignificant cumulative ACWP reviewed for purposes of preventing false variance reporting??

Discussion

LOE WPs may be replanned to align the budget with the expected start and completion dates for work to be executed. LOE WPs may even be replanned within the freeze period when few cumulative actuals have occurred, to ensure that BCWP will be recorded at the proper time to align with the time frame when actual costs are expected to occur. The interpretation of few is less than 10% actuals to date as compared with the cumulative budget. However, if significant actual costs have already been recorded, these baseline changes are prohibited without a scope change.

Impact of Noncompliance

When LOE WPs are not replanned to align with expected actual costs, BCWP will be still be automatically recorded, resulting in a false cost variance.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify re-planned LOE WPs changed within the freeze period have less than 10% actual costs recorded at the time of the replan.
 - a. Review the CBB log to determine if any LOE WPs have been replanned over the past twelve months.
 - b. Review the supporting BCRs to determine how the LOE was realigned and verify that no actual costs had been recorded yet within the WP by reviewing the WP data in the EVM Cost Tool output.
 - c. Compare the new start and completion dates for the adjusted LOE WP budget to the baseline start and completion dates in the IMS. (Note: some contractors may not include LOE WPs in the IMS.)
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

29.D Subsection - Logs

Project logs provide a method of tracking changes to budgets on the project. The logs typically keep a running balance of the current budget reflecting each change impacting the specific account, such as MR or undistributed budget. Each entry made in an account reconciles to other project documentation such as the MR or UB logs, work authorizations, change control documentation, schedules, and control account planning, PMB, and CBB. The logs provide a significant portion of the data required in the monthly EVMS reporting for the IPMR/CPR and PARSII submissions.

The guideline is further defined by QE LOI shown below.

29.D.1	Are MR and/or UB transactions accurately tracked in applicable logs and reports (supported by change control documentation, detailed by control account)?
29.D.2	Are MR/UB/CBB logs reconcilable to the monthly EVMS IPMR/CPR and PARS II reporting to the DOE for applicable Capital Asset projects?
29.D.3	Are the new plans (scope, schedule, budget) reconcilable to the previous values in control accounts and/or Summary Level Work Packages or lower?

QE LOIs Repeated With Discussions

29.D.1 Are MR and/or UB transactions accurately tracked in applicable logs and reports (supported by change control documentation, detailed by control account)?

Discussion

Every transaction for MR or UB must be thoroughly documented with the appropriate supporting details in change control documentation. The documentation must specify the affected control account(s) and contain a good justification for the proposed change. Requests for MR must justify the budget request in terms of the new work scope for the control account. Every transaction must follow the guidance and restrictions established in the contractor's system description.

Typically, an entry is made in the project's applicable budget log (CBB, MR, UB, etc.) when the CAM requests a number to begin preparation of the change. After approval, the approval date is noted in the log, and the appropriate adjustments are made to MR or UB, and to the distributed budget. These adjustments must track directly to the approved change on the change documentation, with a single entry in the log. After approval, the changes are incorporated into the baseline IMS and budget as appropriate and the work authorization document is created or updated to reflect the new baseline. The revised baseline is also reflected in the EVM Cost Tool output for CAPs and also incorporated in the month-end IPMR/CPR.

Impact of Noncompliance

Baseline changes that are inappropriate or improperly tracked result in an unstable and corrupt baseline and lead to poor decision making by the project manager. Baseline changes that are poorly justified may lead to poor work execution and scope creep.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify process documentation describes the requirements for MR and UB tracking in the project's applicable log(s) (CBB, MR, UB, etc.).
 - a. Review the contractor's EVM SD.
 - b. Confirm the process contains a clear description of the requirement to track MR allocation by control account in the applicable log.
 - c. Confirm the process contains a clear description of what is allowable and unallowable for MR allocation.
 - d. Confirm the process contains a clear description of the requirement to track UB distribution by control account in the applicable log.
 - e. Document all discrepancies as compliance concerns
2. Confirm that UB and MR transactions are recorded in the applicable log.
 - a. Review the project's applicable budget log (CBB, UB, MR, BCR, etc.) and select ten approved BCRs from the prior twelve months that involved a MR or UB transaction.
 - b. Verify that the amount recorded in the log is the same amount as documented and approved on the BCR.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

29.D.2 Are MR/UB/CBB logs reconcilable to the monthly EVMS IPMR/CPR and PARS II reporting to the DOE for applicable Capital Asset projects?

Discussion

MR and UB are typically tracked in a consolidated CBB log, but may also be tracked in separate supporting logs. If separate logs are used, they must accurately track to the overall CBB log. The CBB/MR/UB logs must also directly reconcile with the amounts reported in the IPMR/CPR and monthly PARS II reports provided to the DOE customer. There must be no difference in the logs tracked internally and those provided externally to DOE.

Impact of Noncompliance

Providing different data to the customer, in particular CBB logs, will result in false and misleading data being used by the DOE customer and may result in poor programmatic decisions.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify any separate MR and UB logs reconcile to the CBB log.
 - a. If separate logs are used for MR or UB, compare the entries and cumulative balances in the CBB log.
 - b. Document all discrepancies as compliance concerns
2. Verify all values in the CBB Log including MR/UB reconcile with the corresponding numbers reported in the IPMR/CPR.
 - a. $X = (\$ \text{ value of previous period Format 1 CBB} + \text{Sum (all current period CBB changes from log)}) - \text{current Format 1 CBB}$. Repeat for MR/UB/PMB.
 - b. Pass: $X = 0$
 - c. Fail: $X > 0$
3. Confirm the IPMR/CPR to the PARS II reports.
 - a. Compare the reconciled IPMR/CPR values (see 1st test for reconciliation with Logs) with the PARSII reported values; all levels including MR, UB, PMB, and CBB.
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

29.D.3 Are the new plans (scope, schedule, budget) reconcilable to the previous values in control accounts and/or Summary Level Planning Packages or lower?

Discussion

Baseline changes must be implemented in a disciplined manner, with only approved changes being incorporated into the work scope documents (e.g., WBS Dictionary), IMS, and budget baseline. Every change must be supported by a documented and approved baseline change request. The end result is that a direct trace can be made from the prior values for work scope, schedule, and budget to the new or adjusted values in the updated baseline for the control account, WP, or SLPP.

Impact of Noncompliance

Failure to reconcile new plans invalidates the PMB integration of scope, schedule and budget.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm baseline changes are reflected in revised project documentation reconcile to previous documents.
 - a. Review the CBB log and select three BCRs that were approved during the period within the last twelve months.
 - b. Review the BCR for information about the approved changes to work scope, schedule, and budget.
 - c. Compare the following documents for each BCR: CWBS, work authorization document, IMS, and WP budgets.
 - d. Trace from the prior values in the prior documents for work scope, schedule, and budget to the new values in the amended documents.
 - e. There must be traceability from the prior to the new documents, based on the approved BCR changes.
 - f. Document all discrepancies as compliance concerns

Interview Questions

None

Guideline 29 – Revisions Typical Artifacts Common to the QE LOIs

- System Description
- Contractual Work Breakdown Structure Dictionary
- Control Account Plan
- Work Authorization Documents
- Baseline Integrated Master Schedule
- CBB logs
- Project WBS
- Baseline Change Requests and supporting detail
- IPMR/CPR
- Quantifiable back-up detail
- FPRP/FPRA

Guideline 30 – Control Retroactive Changes

Control retroactive changes to records pertaining to work performed that would change previously reported amounts for actual costs, earned value, or budgets. Adjustments must be made only for correction of errors, routine accounting adjustments, effects of customer or management directed changes, or to improve the baseline integrity and accuracy of performance measurement data.

The guideline is further defined by QE LOI shown below.

30.A.1	Does the contractor limit retroactive changes to routine accounting adjustments, definitization of contract actions, customer or management directed changes, or to improve the baseline integrity and accuracy of performance measurement data?
30.A.2	Are changes to previously reported data, (i.e. retroactive changes), being changed only in the current reporting period with the cumulative to date impact and never to already reported data except as documented accounting adjustments in the SD?
30.A.3	Are all retroactive adjustments justifications approved prior to the change being made?
30.A.4	Is any instance of current period negative BCWP limited to unusual events explained adequately in the IPMR/CPR Format 5?
30.A.5	Are single point adjustments restricted to when developing a new realistic PMB and done with prior customer approval consistent with the documented SD?
30.A.6	Are retroactive changes for prior periods limited to rate changes consistent with the disclosure statement?

30.A.1 Does the contractor limit retroactive changes to routine accounting adjustments, definitization of contract actions, customer or management directed changes, or to improve the baseline integrity and accuracy of performance measurement data?

Discussion

Retroactive changes must be limited to the following conditions:

- Routine accounting adjustments, such as clerical errors, cost transfers, calculation errors, prior period omissions, and prior period adjustments to actual overhead rates;
- Customer or management approved actions, such as definitization of previously awarded but undefinitized work;
- Routine rate changes, such as recognition of the final billing rates for the current year;

- Data entry corrections, such as correcting the reporting of BCWP, correction of timekeeping errors, etc.;
- Recording the impact of closing a WP by setting cumulative BCWS to the value for cumulative BCWP; or,
- Economic price adjustments, such as adjustments for inflation on the contract

Impact of Noncompliance

Failure to control and restrict retroactive changes to the above conditions may result in a significant number of retroactive changes to previously reported data, thereby invalidating the monthly analysis and management decisions by the contractor's management and by the DOE.

Verification Steps

Data Analysis (Automatable)

Note: the following checks are not necessarily pass/fail. If there are any CAs or WPs with data that meet the criteria, further review is required as specified in Step 2 of Artifact Traces.

1. At level where budgets are established, check for any negative values for the current period BCWS:
 - a. $X = \$ \text{value of } BCWS_{cur} \text{ where } BCWS_{cur} < 0$
 - b. Pass: $X = 0$
 - c. Fail: $X < 0$
 - d. If this step fails, continue with step 2 in Artifact Traces between Documents.
2. At level where performance is assessed, check for any negative values for the current period BCWP:
 - a. $X = \$ \text{value of } BCWP_{cur} \text{ where } BCWP_{cur} < 0$
 - b. Pass: $X = 0$
 - c. Fail: $X < 0$
 - d. If this step fails, continue with step 3 in Artifact Traces between Documents.
3. At level where budgets are established, check for any negative values for cumulative to date BCWS:
 - a. $X = \$ \text{value of } BCWS_{cum} \text{ where } BCWS_{cum} < 0$
 - b. Pass: X
 - c. Fail: $X < 0$
 - d. If this step fails, continue with step 3 in Artifact Traces between Documents. There must be no instances of negative cum-to-date data.
4. At level where performance is assessed, check for any negative values for cumulative to date BCWP:

- a. $X = \$ \text{ value of } BCWP_{cum} \text{ where } BCWP_{cum} < 0$
 - b. Pass: $X = 0$
 - c. Fail: $X < 0$
 - d. If this step fails, continue with step 3 in Artifact Traces between Documents. There must be no instances of negative cum-to-date data.
5. At level where actuals are incurred, check for any negative values for cumulative to date ACWP:
 - a. $X = \$ \text{ value of } ACWP_{cum} \text{ where } ACWP_{cum} < 0$
 - b. Pass: $X = 0$
 - c. Fail: $X < 0$
 - d. If this step fails, continue with step 3 in Artifact Traces between Documents. There must be no instances of negative cum-to-date data.

Artifact Traces between Documents

1. Verify the process documentation provides adequate controls for retroactive changes.
 - a. Review the contractor's EVM SD and any supporting process documentation.
 1. Confirm there is a clear definition of retroactive changes, along with a clear description of allowable and unallowable retroactive changes.
 2. Document all discrepancies as compliance concerns
2. At level where performance is assessed, check for any negative values for the current period ACWP:
 - a. Excluding adjustments for estimated actuals, $X = \$ \text{ value of } ACWP_{cur} \text{ where } ACWP_{cur} < 0$
 - b. Pass: $X = 0$
 - c. Fail: $X < 0$
 - d. If this step fails, continue with step 2 in Artifact Traces between Documents.
 - e. See Guideline 21 for estimated actuals and adjustments.
3. If any of steps 1 - 2 in the Data Analysis (Automatable) and step 2 in Artifact Traces fail, continue with this step regarding retroactive changes.
 - a. Confirm changes have no effect on history except for the correction of errors.
 - b. Verify any adjustments are compliant with the contractor's system description.
 - c. Document all discrepancies as compliance concerns
4. If any of steps 3 - 5 in the Data Analysis (Automatable) fail, continue with this step regarding retroactive changes.
 - a. Compare the value of the current data to the cumulative data. The value of the negative adjustment for the current period must not exceed the cumulative to date value. For example, $BCWS_{cum} = \$20,000$ and the BCWS adjustment for the current period is $-\$30,000$, resulting in a cumulative value

of -\$10,000. Cumulative data for BCWS, BCWP, or ACWP can never be negative.

- b. $X = \$ \text{ value of cumulative data where cumulative data} < 0$
 - c. Pass: $X = 0$
 - d. Fail: $X < 0$
5. Per the process, verify any retroactive changes are documented.
- a. Review the CBB log and any supporting logs for retroactive changes for the past twelve months.
 - b. Review the reason for each retroactive change to ensure compliance with the allowable conditions stated above and in the contractor's EVM SD.
 - c. Document all discrepancies as compliance concerns

Interview Questions

1. Project Controls: How do you ensure that retroactive changes are allowable?

30.A.2 Are changes to previously reported data, (i.e. retroactive changes), being changed only in the current reporting period with the cum-to-date impact and never to already reported data except as documented accounting adjustments in the SD?

Discussion

When a retroactive change to previously reported data is required, the net impact of the change is recorded and reported in the current reporting period. This ensures that previously reported data does not change, as well as any prior analysis that was performed. The contractor may document in the system description specific accounting adjustments as an exception to this rule, such as adjustments for indirect rates in prior periods.

Impact of Noncompliance

Changing previously reported data in prior months invalidates any prior analysis and also limits the ability to perform predictive analysis for future costs.

Verification Steps

Data Analysis (Automatable)

1. Verify no changes are made to prior reporting periods via the PARSII Retroactive Change Indicator report.

Artifact Traces between Documents

1. Verify the process restricts the reporting of retroactive changes to the current reporting period.
 - a. Review the contractor's EVM SD and any supporting process documentation.
 - b. Does the documented process restrict the reporting of retroactive changes to the current reporting period, with possible exceptions for accounting adjustments such as rates?
 - c. Document all discrepancies as compliance concerns

2. Verify retroactive changes are documented.
 - a. Review the CBB log and any supporting logs for retroactive changes for the past twelve months.
 - b.
 - c. Review the supporting BCR and back up details for BCWS changes and ensure that the approved change is shown in the current period.
 - d. Document all discrepancies as compliance concerns

3. Confirm retroactive changes are incorporated in the current period.
 - a. Review the EVM Cost Tool output for WPs and ensure that all retroactive changes for BCWS, BCWP, or ACWP were incorporated in the current reporting period.
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

30.A.3 Are all retroactive adjustments justifications approved prior to the change being made?

Discussion

All retroactive adjustments must follow the change control process for BCWS changes and other documented processes for BCWP or ACWP changes. (Refer to 30.A.1.) These changes must be fully documented with adequate justifications and approved prior to the adjustments being made and changes made to the reported data. Adjustments resulting from definitization of contract actions should be limited to affected work scope budgets.

Impact of Noncompliance

Failure to obtain approval for retroactive changes prior to implementation will result in unauthorized changes and erroneous data.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm retroactive changes are subject to change control.
 - a. Review the contractor's EVM SD and any supporting process documentation.
 - b. Confirm the documented process clearly defines the requirement that retroactive adjustments for BCWS follow the change control process.
 - c. Verify the SD or supporting process clearly describes the process for preparation and approval of retroactive changes to BCWP and ACWP.
 - d. Document all discrepancies as compliance concerns
2. Verify retroactive changes to BCWS are approved prior to incorporation.
 - a. Review the CBB log and any supporting logs for retroactive changes to BCWS for the past twelve months.
 - b. Review the supporting BCR and compare the approval date with the date of incorporation into the baseline. This date may be shown on the log, but if it is not, determine the month that the change was incorporated and ensure that the approval predates the month-end date of the incorporation.
 - c. Document all discrepancies as compliance concerns
3. Verify retroactive changes to BCWP and ACWP are approved prior to incorporation.
 - a. Review any supporting logs for retroactive changes to BCWP or ACWP for the past twelve months.
 - b. Determine the month that the change was incorporated.
 - c. Compare the approval date on the log to the month-end date for incorporation and ensure that the approval date predates the month-end incorporation.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

30.A.4 Is any instance of current period negative BCWP limited to unusual events explained adequately in the IPMR/CPR Format 5?

Discussion

If negative BCWP is reported in the current period, it would be driven by the need to correct previously reported earned value. This is also known as "de-earning". Valid reasons for reporting negative BCWP is for events when a catastrophic failure has occurred and the work must be completely re-accomplished or to correct an error that significantly over or understated performance and reported to DOE in Format 5 IPMR/CPR.

Impact of Noncompliance

Failure to restrict negative BCWP to rare and catastrophic events may result in de-earning BCWP simply to eliminate variances and avoid variance analysis reporting.

Verification Steps

Data Analysis (Automatable)

1. At level where performance is assessed, check for any negative values for $BCWP_{cur}$:
 - a. $X = \text{Total \$ Value of } BCWP_{cur} \text{ where } BCWP_{cur} < 0$
 - b. Pass: $X = 0$
 - c. Fail: $X < 0$
 - d. If this step fails, continue with step 1 in Artifact Traces between Documents.

Artifact Traces between Documents

1. If step 1 in the Data Analysis (Automatable) fails, continue with this step to determine restrictions on negative current BCWP and related documentation.
 - a. Review the IPMR/CPR for the month of incorporation and determine if the adjustment is explained adequately in the Format 5.
 - b. Document all discrepancies as compliance concerns

Interview Questions

CAM (responsible for reporting negative BCWP):

1. How did you determine what the adjusted value of BCWP should be?
2. Can you describe the event that led to the requirement to adjust performance?
3. How did you get approval?

30.A.5 Are single point adjustments restricted to when developing a new realistic PMB and done with prior customer approval consistent with the documented SD?

Discussion

A Single Point Adjustment (SPA) is the process that sets existing contract cost and/or schedule variances to zero and typically accompanies a replan of remaining effort with the goal of completing the project on schedule and within budget. If a contractor applies the concept of an SPA, then proper controls need to be defined and practiced. Following the implementation of an SPA, the goal should be to develop a new

Performance Measurement Baseline (PMB) that completes all the remaining work using the remaining budget from the original PMB.

Variances may be reset according to the following table. It should be noted that all adjustments are recorded in the current reporting period; in other words, historical reporting is unchanged. Also note that the ACWP is never changed and must always reconcile to the actual accounting records.

Approaches	Method
Eliminate Schedule Variances only (most preferred)	Set cum BCWS equal to cum BCWP
Eliminate Cost and Schedule Variances (least preferred)	Set cum BCWS and BCWP = ACWP
Eliminate Cost Variances only (rare)	Set cum BCWP = ACWP

Figure 19 - Single Point Adjustment Approaches

There are three different approaches for adjusting variances. The preferred approach when deemed necessary and approved is the option which only eliminates the schedule variance. The remaining BCWS is then available for replanning into future periods as part of the replanning exercise. This is a logical approach as the budget corresponds to the revised scope of work, provides a valid basis for measuring performance on the revised work, and historical records of actual costs associated with work performed have not been lost.

The least preferred is to eliminate both cost and schedule variances. The BCWS and BCWP are set equal to ACWP. It is discouraged because it does not accurately reflect the work performed at closeout and invalidates the use of productivity measures used in evaluating revised estimates at completion. A rare approach is where only the cost variances are eliminated. This is done when the schedule information is considered valid.

SPAs must be implemented sparingly, as resetting variances to zero restricts any insight into performance for several months. The contractor must provide advance notification and request for approval to the contracting officer prior to implementation of an SPA. If the contractor also adds additional budget during this process that exceeds the target cost, it is known as an over target baseline (OTB). (Refer to 8.A.4 and 8.A.10).

Impact of Noncompliance

Frequent and uncontrolled use of SPA techniques results in performance variances being continually eliminated, with the result that performance data is useless for analysis and predictive forecasting.

Verification Steps

Data Analysis (Automatable)

Note: the following checks are not necessarily pass/fail. If there are any CAs or WPs with data that meet the criteria, further review is required as specified in Step 2 of Artifact Traces.

1. Find the S = P variation of the Single Point Adjustment:

$$X = \text{Sum (BCWP}_{\text{cur}})$$

When the $SV_{\text{cur}} = 0$ AND Declared EVT \leftrightarrow LOE

$$SV_{\text{cur}} = BCWP_{\text{cur}} - BCWS_{\text{cur}}$$

$$Y = \text{Total BCWP}_{\text{cur}}$$

Pass: $X/Y = 1$

Fail: $X/Y <> 1$

2. Find the P = A variation of the Single Point Adjustment:

$$X = \text{Sum (BCWP}_{\text{cur}})$$

When the $CV_{\text{cur}} = 0$

$$CV_{\text{cur}} = BCWP_{\text{cur}} - ACWP_{\text{cur}}$$

$$Y = \text{Total BCWP}_{\text{cur}}$$

Pass: $X/Y = 1$

Fail: $X/Y <> 1$

3. Find the S = P = A variation of the Single Point Adjustment:

$$X = \text{Sum (BCWP}_{\text{cur}})$$

When the $SV_{\text{cur}} = 0$ AND Declared EVT \leftrightarrow LOE

And

When the $CV_{\text{cur}} = 0$

$$SV_{\text{cur}} = BCWP_{\text{cur}} - BCWS_{\text{cur}}$$

$$CV_{\text{cur}} = BCWP_{\text{cur}} - ACWP_{\text{cur}}$$

$$Y = \text{Total BCWP}_{\text{cur}}$$

Pass: $X/Y <> 0$

Fail: $X/Y = 0$

4. Find the S = P variation of the Single Point Adjustment:

$$X = \text{Sum (BCWP}_{\text{cum}})$$

When the $SV_{\text{cum}} = 0$ AND Declared EVT \leftrightarrow LOE

$$SV_{cum} = BCWP_{cum} - BCWS_{cum}$$

$$Y = \text{Total } BCWP_{cum}$$

Pass: $X/Y = 1$

Fail: $X/Y <> 1$

5. Find the P = A variation of the Single Point Adjustment:

$$X = \text{Sum } (BCWP_{cum})$$

When the $CV_{cum} = 0$

$$CV_{cum} = BCWP_{cum} - ACWP_{cum}$$

$$Y = \text{Total } BCWP_{cum}$$

Pass: $X/Y = 1$

Fail: $X/Y <> 1$

6. Find the S = P = A variation of the Single Point Adjustment:

$$X = \text{Sum } (BCWP_{cum})$$

When the $SV_{cum} = 0$ AND Declared EVT $<>$ LOE

And

When the $CV_{cum} = 0$

$$SV_{cum} = BCWP_{cum} - BCWS_{cum}$$

$$CV_{cum} = BCWP_{cum} - ACWP_{cum}$$

$$Y = \text{Total } BCWP_{cum}$$

Pass: $X/Y <> 0$

Fail: $X/Y = 0$

Artifact Traces between Documents

1. If the contractor chooses to incorporate an SPA process, confirm it is properly documented.
 - a. Review the contractor's EVM SD and any supporting process documentation for a clear description of the SPA process, its use, and the requirement to limit these adjustments to rebaselining in order to lay in a more realistic baseline.
 - b. Verify the SD or process documentation requires that advance notification of a SPA be given to the customer's contracting officer for approval.
 - c. Document all discrepancies as compliance concerns
2. If step 1-6 in the Data Analysis (Automatable) identifies SPA adjustments, continue with this step to evaluate SPA documentations and implementation.

- a. Review the data for the CAs or WPs in the output from the EVM Cost Tool for the reporting period. Review the supporting details for compliance with the contractor's processes and any specific guidance issued for the SPA.
- b. Review the customer's contracting officer approval documentation and compare the date of the approval to the date of the SPA. The approval date must be earlier than the date of the SPA incorporation.
- c. Document all discrepancies as compliance concerns

Interview Questions

None

30.A.7 Are retroactive changes for prior periods limited to rate changes consistent with the disclosure statement?

Discussion

Retroactive adjustments because of rate changes are only made to ACWP and are limited to adjustments to incorporate the actual, finalized rate. These adjustments may occur throughout the year or at the end of the year when the rate is finalized, and must be consistent with the Disclosure Statement. The cumulative values for the BCWS and BCWP are not adjusted for direct or indirect cost rate increases or decreases. The values for BCWS and BCWP are not adjusted because the recorded values have been applied with the budgeted rate for indirects, and applying actual rate adjustments to this data would introduce a cost variance where none should exist. Any change to the budgeted or planning rates must occur only in the future. This enables credible trend analysis for projecting future cost and schedule performance and accurate Estimates at Completion (EACs).

Impact of Noncompliance

Changing previously recorded values for BCWS and BCWP because of rate changes would violate the basis for these values, i.e., these are budgeted rates not actual rates. This would result in variance distortion for previously reported performance data.

Verification Steps

Data Analysis (Automatable)

1. Identify if any changes to ACWP have been made in prior reporting periods via the PARSII Retroactive Change Indicator report.

Artifact Traces between Documents

1. Confirm the process restricts retroactive rate changes to ACWP values.

- a. Review the contractor's EVM SD and any supporting process documentation.
 - b. Verify there is a clear description of the restrictions for allowing retroactive rate changes only to ACWP.
 - c. Confirm process includes checking for consistency with the Disclosure Statement.
 - d. Document all discrepancies as compliance concerns
2. If any changes to ACWP were identified via the Data Analysis Step 1 (PARSII Retroactive Change Indicator report):
- a. Review any supporting logs for retroactive rate changes to ACWP for the past six periods.
 - b. Review the supporting details for these changes and determine if the rates were adjusted solely to the finalization of the prior or current year rates.
 - c. Trace the adjustments and compare the adjusted rates that were applied to official documentation from DCAA/DOE CFO granting approval for the rates changes consistent with the Disclosure Statement.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

Guideline 30 – Revisions Typical Artifacts Common to the QE LOIs

- System Description
- CBB logs
- Baseline Change Requests and supporting detail
- FPRA/FPRP

Guideline 31 – Prevent Unauthorized Revisions

Prevent revisions to the project budget except for authorized changes.

The guideline is further defined by QE LOI shown below.

31.A.1	Are project budgets (CBB or TAB) only revised through project authorization from DOE?
31.A.2	Are changes to the CBB implemented after the customer approval date?
31.A.3	Is authorization of budgets in excess of the CBB (resulting in an Over Target Baseline) controlled and done with the knowledge and approval of the procuring authority?

31.A.1 Are project budgets (CBB or TAB) only revised through project authorization from DOE?

Discussion

Disciplined baseline change control helps maintain the relationship between the Contract Budget Base (CBB) at target cost and the project value (includes profit and/or fee). This ensures the project manager is managing with performance measurement data that accurately reflects only the authorized scope of work. Unauthorized revisions could inadvertently result in baseline budgets or schedules that exceed the CBB. The CBB is a controlled value and cannot be changed by the contractor except as a result of customer contract actions.

Typically, the contractor will issue a project authorization document at the total project level at project award and at subsequent revisions to the project value through modifications. These documents must track directly to the project value. The project authorization document is issued to the project manager, giving him the authority to plan the new work scope within the new or revised project budget and plan the CBB at target cost.

Impact of Noncompliance

Unauthorized revisions could inadvertently result in baseline budgets or schedules that exceed the contract budget base (CBB). Failure to maintain this one to one relationship between the CBB and the project value may also result in authorized work not being approved and budgeted if the CBB target cost does not reconcile with the value of the project which includes profit and/or fee.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify any changes to project budget values are authorized.
 - a. Review the CBB log over the past twelve months.
 - b. Confirm any change to the CBB or TAB results only from a contract/project award or modification.
 - c. Ensure the contract/project award or modification number is noted in the log.
 - d. Verify the date of the log entry was after the effective date of the award or modification.
 - e. Document all discrepancies as compliance concerns
2. Confirm the internal and external CBB values reconcile.
 - a. Review the IPMR/CPR Format 1 for the last three months.
 - b. Compare the CBB reported in the IPMR/CPR for each month to the CBB shown in the Log for the same month.
 - c. Verify the CBB Log and IPMR/CPR report the same number.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

31.A.2 Are changes to the CBB implemented after the customer approval date?

Discussion

Any change to the CBB must be implemented after the date the customer's Contracting Officer approved the change to the contract or project. The date of the official contracting action must precede any action on the part of the contractor to authorize, plan, or execute the new work scope.

Impact of Noncompliance

Implementation of a CBB change prior to official approval results in unauthorized changes and the potential for the CBB to exceed the contract or project value.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify any changes to project budget values are authorized.
 - a. Review the CBB log over the past twelve months.
 - b. Did any change to the CBB or TAB result only from a contract award or contract modification?
 - c. Conduct a manual check to confirm the date of the CBB log entry was subsequent to the effective date of the contract modification.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

31.A.3 Is authorization of budgets in excess of the CBB (resulting in an Over Target Baseline) controlled and done with the knowledge and approval of the procuring authority?

Discussion

Authorization of budgets in excess of the CBB is known as an Over Target Baseline (OTB). This is also known as reprogramming, and is a significant undertaking by the contractor to replan the remaining baseline. When the amount of the over target budget is added to the CBB, an OTB results. This new value is known as the Total Allocated Budget, as shown in the following graphic.

TAB is Total Allocated Budget. TAB minus CBB is the OTB amount.

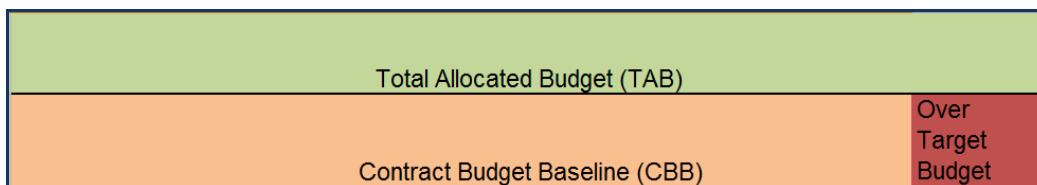


Figure 20 - TAB Illustration

In order to prevent unauthorized increases to the TAB, causing it to exceed the CBB value, prior approval is required between the contractor and the government for implementation of an Over Target Baseline (OTB). This reinforces the mutual management of the project. Additionally, recognition of the OTB on cost reimbursement contracts notifies the DOE customer that additional funding will be required to complete the contract.

Impact of Noncompliance

Failure to obtain approval from the DOE customer prior to OTB implementation results in an unauthorized change to the baseline, exposing DOE to cost overruns and additional funding requirements that potentially cannot be met. This prevents DOE from properly managing oversight on the contract.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the process for an OTB is documented.
 - a. Review the contractor's EVM SD and any supporting process documentation.
 - b. Confirm there is a clear description of the OTB process.
 - c. Verify the documentation clearly outlines the requirement to obtain DOE approval prior to the initiation of the OTB process.
 - d. Document all discrepancies as compliance concerns
2. Confirm any implemented OTBs adhere to the process.
 - a. Review the CBB log to determine if any OTBs have been implemented.
 - b. Note the date of the OTB and the official contracting officer documentation granting approval to initiate the OTB.
 - c. Verify the date of the OTB occurs after the approval date.
 - d. When comparing the approval date from the CBB log to the IPMR/CPR reports, confirm the OTB was incorporated in the same month.
 - e. Verify the OTB is reported properly in the IPMR/CPR.
 - f. Document all discrepancies as compliance concerns

Interview Questions

None

Guideline 31 – Revisions Typical Artifacts Common to the QE LOIs

- System Description
- Contractual Documents
- CBB Logs
- Baseline Change Requests and supporting detail
- IPMR/CPR
- Customer Approval for OTB

Guideline 32 – Document PMB Changes

Document changes to the performance measurement baseline.

The guideline is further defined by QE LOI shown below.

32.A.1	Are authorized changes to the PMB documented and traceable throughout the contractor's system?
32.A.2	Do changes to the PMB only include those made as a result of formal reprogramming, contractual redirection, internal replanning, distribution of UB, and use of MR?
32.A.3	Are changes to the PMB recorded in the project documentation (WADs, WBS Dictionary, schedules, logs, RAM, internal change documentation, and significant changes addressed in external reports such as IPMR/CPR, and PARSII)?
32.A.4	Does change documentation provide visibility into the "from/to" changes by control account and the control account time-phasing?
32.A.6	Is the baseline change approved and incorporated into the baseline prior to the start of the work?

32.A.1 Are authorized changes to the PMB documented and traceable throughout the contractor's system?

Discussion

Using a disciplined, systematic change control process to document PMB changes provides assurance that everyone on the project team is using the same technical scope, schedule, and budget baselines to measure and manage performance. This enhances internal and external management confidence in the performance data that is used to make programmatic decisions.

The PMB should always reflect the most current plan for accomplishing the effort. Authorized changes must be incorporated into the PMB and authorization documents updated accordingly prior to the commencement of work. Documented changes made to the PMB must be traceable and substantiated. The contractor's EVM SD must describe a process for proper documentation of baseline changes.

Impact of Noncompliance

Failure to properly document baseline changes results in a poor baseline that will be difficult to execute. This will also result in difficulty when implementing subsequent baseline changes.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify baseline change documentation requirements.
 - a. Review the contractor's EVM SD and any supporting process documentation.
 - b. Verify the requirement to justify any baseline changes on the BCR and for traceability from the BCR throughout the system.
 - c. Document all discrepancies as compliance concerns
2. Verify baseline changes are documented and justified.
 - a. Review the CBB log and select ten baseline change requests.
 - b. Confirm the justification addresses the differences between the original baseline and the proposed change, including the rationale for the change.
 - c. The justification must also include scope, schedule, and budgetary impacts.
 1. X=# of baseline change documents without justification
 2. Pass: X = 0
 3. Fail: X <> 0
3. Confirm approved changes in the baseline budget and schedule are traceable.
 - a. Review the CBB log and select three BCRs for the last twelve months .
Trace the approved baseline change through the following documents:
 1. Budget: trace the phased budget from the BCR details to the WP budgets in the EVM Cost Tool output and to the resource loading in the IMS.
 2. Total budget: trace the total BAC for each control account from the BCR to the EVM Cost Tool output, WAD, dollarized RAM, internal cost reports and IPMR/CPR (if available at that level)
 3. Schedule: trace the revised dates from the BCR to the baseline IMS dates and the WAD.
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

32.A.2 Do changes to the PMB only include those made as a result of formal reprogramming, contractual redirection, internal replanning, distribution of UB, and use of MR?

Discussion

Baseline change documentation must specify whether the proposed change is because of one of the following:

- Formal reprogramming, also known as an Over Target Baseline (OTB)
- Contractual or project redirection because of an official, written change from the customer's Contracting Officer
- Internal replanning (following the guidance and restrictions in the contractor's EVM SD)
- Distribution of UB to CAs/SLPPs
- Use of MR and allocation to CAs

Impact of Noncompliance

Without a clear identification of the reason for the change, the project manager (or approving authority) does not have enough insight to approve the change.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Confirm baseline change requirements.
 - a. Review the contractor's EVM SD.
 - b. Verify the SD clearly states the requirement to document the proposed baseline change because of either formal reprogramming, external contract modification, internal replanning, or distribution of UB or MR.
 - c. Document all discrepancies as compliance concerns
2. Verify baseline changes are justified, per the process.
 - a. Review the CBB log and select ten BCRs from the past six periods.
 - b. Review each BCR to verify that the BCR justifies the baseline change because of one of the above stated reasons.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

32.A.3 Are changes to the PMB recorded in the project documentation (WADs, WBS Dictionary, schedules, logs, RAM, internal change documentation, and significant changes addressed in external reports such as IPMR/CPR, and PARSII)?

Discussion

It is essential that an integrated baseline be maintained by ensuring that all parts of the baseline, plus any reporting, are consistent and show the current values. After

approval of the baseline change, all appropriate documentation must be updated to reflect the new baseline values for the control account(s). This includes, for example:

- Work authorization documents
- CAPs
- Quantifiable back up data spreadsheets for BCWP
- IMS
- WBS Dictionary
- Dollarized RAM
- Organizational chart (as appropriate)
- Contract Budget Base Log

Once properly incorporated into the baseline, the changed baseline must then be reflected in internal and external performance reports.

Impact of Noncompliance

Failure to ensure that all baseline documentation represents the most current baseline and shows consistent values will result in a poor baseline plan, poor execution, and the potential for out of scope work or unauthorized charges.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the requirement to update baseline documents after BCR approval
 - a. Review the EVM SD
 - b. Does the document clearly state the requirement to update baseline documents after BCR approval?
 - c. Does it specify the documents and who is responsible for the update?
 - d. Document all discrepancies as compliance concerns
2. Manual check that compares baseline change document for a mod to IMS to verify that changes are incorporated.
 - a. Review the CBB log and select three BCRs from the past twelve months that include a change to the IMS.

- b. Compare the what-if schedule documentation included with the BCR to identify the changes.
 - c. Compare the what-if schedule to the IMS by period before and after the change.
 - d. Verify the changes have been made and documented in the schedule to include coding with the BCR number.
 - e. If the IMS is resource loaded, ensure resources have been updated to reflect the change.
 - f. All authorized schedule changes are to be reflected in the IMS.
3. For BCRs including a change in budget, compare the Baseline Change and or CBB log to the IPMR/CPR Format 3
- a. X = The sum of the selected budget change values in the selected period in the CBB log
 - b. Y = The sum of the selected budget change values in Format 3 of the IPMR/CPR (if applicable)
 - c. Pass: $X/Y = 1$
 - d. Fail: $X/Y <> 1$
4. Verify baseline documentation is updated after baseline change.
- a. Review the CBB log and select ten approved baseline change requests. Select these from the period beginning twelve months ago through three months ago.
 - b. Review the BCRs to determine if any of the following baseline documents should have been modified: WBS, WBS Dictionary, IMS, RAM, subcontracts/purchase orders, control account/WP plans, work authorization documents, or other baseline documents as specified by the EVM SD.
 - c. Confirm the appropriate documents been modified after the BCR approval.
 - d. Verify the documents were subsequently approved by the correct authority within the same accounting month as the BCR approval.
 - e. Document all discrepancies as compliance concerns

Interview Questions

1. CAM: After a BCR has been approved, what other baseline documents must be amended, and which ones are you responsible for amending? How do you follow up to ensure that all baseline documents have been amended?
2. Project controls: After a BCR has been approved, what other baseline documents must be amended, and which ones are you responsible for amending? How do you follow up to ensure that all baseline documents have been amended?

32.A.4 Does change documentation provided visibility into the “from/to” changes by control account and the control account time-phasing?

Discussion

It is essential for baseline change requests to have supporting detail that shows, by control account, the time phased budgets by element of cost for the current baseline and the proposed baseline. This allows for a proper review and approval of the proposed change, and subsequent incorporation into the baseline. The intent is to ensure the change documentation provides a clear description of what is changing. A “before and after” picture is often used to fully describe the change.

Impact of Noncompliance

Failure to properly document the proposed time phased budget prevents the approving authority from making an informed decision and determining whether the proposed resources are available to support the change.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify baseline change documents require time phased budget by EOC.
 - a. Review the EVM SD and any supporting processes.
 1. Confirm the document clearly states the requirement to provide time phased budget details by element of cost as supporting details for proposed BCRs.
 2. Document all discrepancies as compliance concerns
2. Confirm the CA documentation reconciles to baseline changes
 - a. Review the CBB log and select three approved BCRs from the period twelve months ago to three months ago.
 - b. Compare the budget delta on the BCR to the delta in CAP budgets (month of incorporation – prior month).
 - c. $X = \$$ of misaligned budget between baseline change document budget and CAP budget delta from prior month
 - d. Pass: $X = 0$
 - e. Fail: $X <> 0$
3. Review the CBB log and select ten BCRs from the past twelve months.
 - a. Confirm the proposed time phased budgets by element of cost are included in the BCR supporting details.
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

32.A.5 Is the baseline change approved and incorporated into the baseline prior to the start of the work?

Discussion

Baseline changes must be approved according to the contractor's documented change control process prior to work starting or the start date of the changed baseline. This ensures that only authorized work is being executed and that adequate resources are available to support the revised plan.

Impact of Noncompliance

Starting on proposed work prior to approval results in unauthorized changes to the baseline and the potential that work may be performed that may yet be disapproved.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify baseline changes approval timing requirements.
 - a. Review the EVM SD and any supporting processes.
 - b. Does the document clearly state that baseline changes must be approved prior to the start of work?
 - c. Does it state that the baseline change approval must be before the proposed start of the baseline change?
 - d. Review the CBB log and select three approved BCRs from the past six periods.
 - e. Pull the WADs for the applicable BCRs and compare the BCR and WAD approval dates to date the effort started in the IMS. Verify the work was authorized before it was started.
 - f. $X = \#$ of baseline change documents with approval dates after first occurrence of actuals.
 - g. Pass: $X = 0$
 - h. Fail: $X > 0$

Interview Questions

None

Guideline 32 – Revisions Typical Artifacts Common to the QE LOIs

- System Description

- Integrated Master Schedule
- CBB logs
- Baseline Change Requests and supporting detail
- Control Account Plan
- Contract Work Breakdown Structure Dictionary
- Responsibility Assignment Matrix
- Subcontracts/purchase orders
- Work Authorization Documents
- IPMR/CPR

SECTION 7 – INDIRECT GUIDELINES (GUIDELINES 4, 13, 19, 24)

Indirect costs are a broad category that typically represents a majority of project costs and are defined as costs that cannot be directly charged to only one project but must be allocated. The term indirect includes all of the project burdens on direct work. Examples include overhead, General and Administrative (G&A), Cost of Money (COM), and types of supervision that allocate their time.

Since indirect costs are significant as compared to total project costs, the earned value guidelines require that the structure is defined and the company organization or function is identified for the responsibility for controlling indirect (overhead) costs (guideline 4), indirect costs are budgeted (guideline 13), indirect actuals are accrued (Guideline 19), and indirect analysis is performed (guideline 24). Although this process parallels at a high level the traditional application of earned value, there are differences that warrant this appendix:

- Indirect cost structures are different. Indirect costs are grouped into indirect pools, which are then allocated against the appropriate bases to yield the planned indirect rates.



Figure 21 - Indirect Rate Illustration

- Indirect costs are typically annually based as planned rates, with adjustments at year end to actual rates.
- Indirect costs are not managed with a project schedule or IMS.
- The goal of indirect cost management is stability of overhead rates and control of indirect costs. Management of indirect costs may include scope reduction (example no 4th quarter overhead training).
- The Chief Financial Officer (CFO) typically has overall responsibility for indirect management.
- Indirect costs are not managed through EVM CAs but rather through assignment of responsibility within the organization as typical in the accounting organization.
- Indirect analysis is performed by the responsible indirect cost manager but must also be considered by the project's control account managers during control account analysis.
- Change control management is not as relevant to indirect pools because of the annual planning and allocation of final costs for the year.

The contractor identifies the indirect pools and application bases in their Disclosure Statement and indirect policy. Each contractor may define pools and application bases differently to meet their respective corporate structures and business situations. However, each contractor must document who has responsibility for budgeting, charging, and analysis of major components in each significant pool in their accounting policy, procedures, authorization memos and/or their EVM SD.

DOE's interpretation of the intent of each of the four Indirect Considerations guidelines and expectations for implementing each guideline are below.

Guideline 4 - Identify Overhead Management

Identify the company organization or function responsible for controlling overhead (indirect costs).

The guideline is further defined by QE LOI defined below.

QE LOI Guideline 4

4.A.1	Is the indirect pool(s) account structure defined to the responsible organizational level?
4.A.2	Does a disclosure statement or other document define the indirect cost structure, burden base and the type of cost contained in each defined rate?
4.A.3	Is there a process that clearly reflects how indirect cost responsibility is established, budgets are developed, authority is controlled for expenditures, thresholds are published, expenses are controlled, and variance analysis is performed as necessary?
4.A.4	Are responsibilities regarding indirect budget consistent between the disclosure statement, functional organization charts, the system description and lower level indirect procedures?
4.A.5	Are the organizational assignments and authority level clearly defined for each indirect pool/category?
4.A.6	Is the level of indirect cost allocation and management within the project defined in the contractor's System Description or detailed indirect procedures?
4.A.7	Do managers with assigned responsibility for controlling indirect costs have documented authority, with limits, over the charges within the pool?
4.A.8	Does the cost accounting standards disclosure statement or other document identify the allocation base and indirect cost pools and define applicable cost elements for tracking?
4.A.9	Do procedures document the process for managing indirect pool corrective actions?
4.A.10	Are indirect policies and the system description consistent with the Disclosure Statement?

QE LOIs Repeated With Discussions

4.A Summary – Identify Overhead Management

Visibility into direct and indirect costs is essential for successful management of a project since they account for a major portion of the costs of any project. Therefore, it is

important to have a documented process and organizations established specifically to manage and control indirect costs. Indirect costs are for common activities that cannot be identified specifically with a particular project or activity and should typically be budgeted and controlled separately at the functional or organizational manager level. Typical indirect costs include overhead, burden, Cost of Money (COM) and General and Administrative (G&A).

The EVM SD and/or indirect procedures must clearly identify managers who are assigned responsibility and authority for controlling indirect costs and who have the authority to approve expenditure of resources. The process for management and control of indirect costs, including assignment of responsibility, is documented in the contractor's Cost Disclosure Statement, the responsible organization's approved accounting procedures, and the EVM SD at various levels.

4.A.1 Is the indirect pool(s) account structure defined to the responsible organizational level?

Discussion

The contractor's indirect pool(s) account structure must be defined to the responsible organizational level in the Disclosure Statement or the Accounting Procedures. The need to do so must be stated in the EVM SD. Responsibility must be clearly established for indirect cost control. These responsibilities must be established for each indirect pool and/or category and must be defined to the responsible organizational level and assigned to individual managers. It is paramount that someone be assigned the specific responsibility of managing indirect cost and exerting control over variances. As indirect costs can significantly impact the cost of a project, it is important for the project manager to know who is responsible for authorizing and controlling overhead (indirect) budgets and expenditures.

Impact of Noncompliance

Failure to define the indirect pool(s) account structure to the responsible organizational level in the Disclosure Statement and/or Accounting Procedures can lead to a lack of indirect cost control and to the possibility of serious cost growth problems on projects.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the indirect pool(s) account structure is defined to the responsible organizational level in the Disclosure Statement and/or the Accounting Procedures
 - a. Obtain the Disclosure Statement and ensure it is approved by the responsible DOE contracting officer or DOE CFO Organization and current with the contractor's indirect procedures. Verify the indirect pool(s) account structure is defined to the responsible level.
 - b. Obtain the Contractor's Accounting Procedures and review the indirect management procedures verify they include a clearly defined indirect pool/account structure.
 - c. Obtain and review the organizational chart(s) to ensure it clearly identifies indirect management responsibilities to the responsible organization.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

4.A.2 Does a disclosure statement or other document define the indirect cost structure, burden base and the type of cost contained in each defined rate?

Discussion

The contractor has the responsibility to propose indirect budgets and to account for these budgets and the distribution of actual indirect costs in accordance with the government approved Disclosure Statement. The contractor has the responsibility to handle indirect budgets and costs in accordance with generally accepted accounting principles (GAAP) described in the contractor's accounting procedures.

The contractor's accounting procedures must define the indirect cost structure, the burden base and the type of cost contained in each defined rate since indirect costs account for a major portion of the costs of any project/contract. Indirect costs exist in essentially three broad categories.

The first category is for overhead costs for services that benefit more than a single project/contract. Examples may include routine building costs. These costs benefit multiple-projects and therefore are an overhead cost.

The second category may include the indirect burdens which are costs associated with employees, over and above gross compensation or payroll costs. Typical costs associated with the burden rate include payroll taxes, worker's compensation and health insurance, paid time off, training and travel expenses, vacation and sick leave, pension contributions and other benefits.

A third type of indirect costs is classed as general and administrative (G&A) expenses. Expenditures may relate to the day-to-day operations of a business. General and administrative expenses pertain to operation expenses rather that to expenses that

can be directly related to the production of any goods or services. General and administrative expenses include rent, utilities, insurance and managerial salaries.

Facilities capital cost of money (COM) is another type of indirect costs that is an allowable cost and legally can be charged to government contracts. It is a formula based allocation applied on a contract similar to overhead. It helps offset government unique working capital costs required to execute the project.

Impact of Noncompliance

Failure to define the indirect cost structure, burden base and the type of cost contained in each defined rate could cause indirect costs to be allocated, budgeted and collected in an inconsistent manner and can lead to a lack of indirect cost control and serious cost-overrun problems for projects.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify that the Disclosure Statement or the Contractor's Accounting Procedures define the indirect cost structure, burden base and the type of cost contained in each defined rate.
 - a. Obtain the Disclosure Statement and Accounting Procedures. Review to ensure one of these documents defines the indirect cost structure, burden base and the type of cost contained in each rate. Document all discrepancies as compliance concerns

Interview Questions

None

4.A.3 Is there a process that clearly reflects how indirect cost responsibility is established, budgets are developed, authority is controlled for expenditures, thresholds are published, expenses are controlled, and variance analysis is performed as necessary?

Discussion

This QE LOI sets up the requirement for the contractor to have documentation and execution of an indirect budgeting, expenditure, and analysis of all indirect pools.

Impact of Noncompliance

Failure to provide written procedures that clearly define the indirect cost processes could lead to ineffective management and control of indirect costs – leading to significant cost overruns for the project.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the Contractor's EVM SD clearly describes or references procedures that reflect processes for Indirect Management and Control. Also, verify the Accounting Procedures clearly describe the procedures that reflect those same Indirect processes.
 - a. Obtain the EVM SD and check to see if detailed procedures are described or referenced (e.g., Accounting Procedures for Indirect Management and Control) for the processes to establish indirect cost responsibility, develop budgets, control authority for expenditures, publish thresholds, control expenses and perform variance analysis as necessary.
 - b. Obtain the Contractor's Accounting Procedures and review the indirect management procedures to ensure they clearly define the processes for establishing indirect cost responsibility, developing budgets, controlling authority for expenditures, publishing thresholds, controlling expenses and performing variance analysis as necessary.
 - c. Is the implementation consistent with the defined process?
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

4.A.4 Are responsibilities regarding indirect budget consistent between the disclosure statement, functional organization charts, the system description and lower level indirect procedures?

Discussion

Responsibilities regarding indirect budget must be consistent between the Disclosure Statement, functional organization charts, the EVM SD and detail level indirect procedures. This ensures that everyone within the company recognizes the office/role within the company structure that is responsible for establishing, approving, managing, authorizing and controlling overhead (indirect) budgets and expenditures.

Impact of Noncompliance

The lack of clear definition of organizational assignments and authority level for each indirect pool/category can lead to a lack of indirect cost control and to serious cost overrun problems for projects.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the Disclosure Statement, the Contractor's organization charts; the Accounting Procedures; and the EVM SD are consistent when defining indirect budget responsibilities.
 - a. Obtain and review the Disclosure Statement, the Contractor's organization charts, the Accounting Procedures and the EVM SD to ensure they are consistent across all documents for definition of indirect budget responsibilities.
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

4.A.5 Are the organizational assignments and authority level clearly defined for each indirect pool/category?

Discussion

Among the controls necessary to manage indirect costs is the establishment of responsibility for control of such costs. This begins with a clear definition of who is responsible for establishment of indirect budgets. Normally this is a centrally controlled function residing with the Chief Financial Officer (CFO) because indirect cost goals establish the indirect rates that will eventually be applied to the direct costs. Indirect budgeting responsibilities must be clearly stated, as must the indirect budgeting process.

Note – this person is not typically the CEO. Although the CEO may direct annual targets for indirect cost management they typically do not have day to day management responsibility for the indirect pools. The intent of this QE LOI is to define the person that is responsible for the day to day management of the pools. The organizational assignments and authority must be clearly defined for each indirect pool/category in the Indirect Accounting Procedures and organizational charts. The need to define this responsibility for each pool/category (and where to find the responsibilities) must be stated in the EVM SD.

In addition to budgeting responsibility, assignment and control of the indirect resources is also a responsibility that must be clearly defined. This responsibility is often assigned to the managers who are most directly responsible for providing these indirect services. Such authorization responsibility is often placed separately at each indirect pool or category.

Impact of Noncompliance

The lack of clear definition of organizational assignments and authority level for each indirect pool/category can lead to a lack of indirect cost control and to serious cost overrun problems for projects.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify organizational assignments and authority level are clearly defined for each indirect pool/category.
 - a. Obtain and review the contractor's organization charts and check to see if organizational assignments and authority level have been established for each indirect pool/category.
 - b. Obtain job descriptions, task assignments, and control assignments to determine if there is a clear description and assignment to manage and control indirect costs for each indirect pool/category.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

4.A.6 Is the level of indirect cost allocation and management within the project defined in the contractor's System Description or detailed indirect procedures?

Discussion

The contractor must define within the EVM SD or detailed indirect procedures how indirect costs will be allocated and applied within the project budgets. This is typically defined at the control account/WP level, i.e., indirect rates are applied against the direct budgets within the WP to generate indirect budget. This is generally referred to as burdening the direct costs. This level of burdening is typically consistently applied across all projects; however, in some cases specific project directives may direct otherwise.

While the CAMs bear full responsibility for managing and analyzing direct costs, the contractor will assign responsibility for managing and analyzing indirect costs at a higher level or to the project controls group. (See Guideline 24.)

Impact of Noncompliance

Failure to define and document the contractor's level of indirect cost allocation and management for projects could lead to an inequity of cost allocation to projects and a lack of cost control and serious cost overrun problems.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the contractor's EVM SD and/or detailed indirect procedures define the level of indirect cost allocation and management within the project.
 - a. Obtain the contractor's EVM SD and detailed indirect procedures. Verify within these documents that formal guidance for identifying, defining and managing the level of indirect cost allocation within the project exists.
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

4.A.7 Do managers with assigned responsibility for controlling indirect costs have documented authority, with limits, over the charges within the pool?

Discussion

In addition to clearly identifying who has what type of responsibility with regard to indirect cost control, it is necessary to define the authority and limits available to these assigned managers. This includes a clear, formal statement of each indirect manager's authority and responsibility within the company's indirect control system. To be effective in the control of indirect resources, for example, a manager must have the authority to either approve or avoid the expenditure of resources and must have the responsibility for justification when the expenditure of indirect resources is incurred. The managers must also have the authority to initiate cost corrections for costs that are recorded in error. The limits of each indirect manager's authority must be stated very specifically. The EVM SD may contain a more broad statement of the indirect manager's responsibilities, while the detailed indirect procedures should go into more detail.

Impact of Noncompliance

Failure to clearly and specifically identify indirect cost managers' authority would cause the managers to be ineffective in controlling those indirect costs and could lead to significant cost overrun for the projects.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Obtain the contractor's EVM SD and detailed indirect procedures and verify they describe the managers' responsibility for controlling indirect costs and their authority over the charges within the indirect cost pool
 - a. Ensure the managers are able to initiate cost corrections.
 - b. Ensure limits of each indirect manager's authority are stated very specifically.
 - c. Obtain the managers' job description and ensure the managers' responsibility for managing and controlling indirect costs is included.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

4.A.8 Does the cost accounting standards disclosure statement, or other document, identify the allocation base and indirect cost pools and define applicable cost elements for tracking?

Discussion

Indirect costs are grouped into indirect pools, which are then allocated against the appropriate bases to yield the planned indirect rates.



Figure 22 - Indirect Rate Illustration 2

The contractor must have formal (written) procedures for identifying the applicable cost elements which contribute to each indirect cost pool. These procedures must also

Identify the method used to allocate costs from the pools to the appropriate receiving bases. The following example shows how the processes should describe the composition of the indirect pool and the allocation bases.

The need for these descriptions will exist in the contractor's EVM SD which will reference the actual descriptions located in the contractor's Disclosure Statement and internal accounting procedures/instructions. The contractor must perform periodic internal audits of the system to ensure that the procedures describing the handling of indirect costs are being adhered to.

Impact of Noncompliance

Failure to identify the allocation base and indirect cost pools and define applicable cost elements for tracking in the Disclosure Statement and the contractor's accounting procedures can lead to a lack of cost control and serious cost overrun problems for projects.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Obtain the contractor's Disclosure Statement and Accounting Procedures (detailed indirect procedures).
 - a. Verify that allocation bases, indirect cost pools, and any cost elements used for tracking are identified and defined in one of these documents.
 - b. Document all discrepancies as compliance concerns

Interview Questions

None

4.A.9 The procedures document the process for managing indirect pool corrective actions?

Discussion

Specific variance thresholds must be established for the various indirect categories to define when they are significant (out of tolerance). Variances caused by actual indirect costs exceeding their budgets must be analyzed by the responsible indirect manager on a recurring basis. (See Guideline 24.) Significant variances and unfavorable trends must be

thoroughly investigated and corrective actions planned as required. Management must review and follow up on these corrective actions to ensure completion. The contractor must document the responsibilities for this process in accounting procedures for consistent application.

While Guideline 24 focuses on indirect cost analysis, this LOI instead focuses on the management of corrective actions for indirect cost variances and the correct assignment of management responsibility.

Impact of Noncompliance

Failure to document and manage indirect pool corrective actions could lead to inconsistent management control of indirect costs and lead to cost overruns for indirect costs on projects.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Obtain the contractor's Accounting Procedures (detailed indirect procedures) and verify they document the processes and responsibility for managing indirect pool corrective actions, including the requirement for management review and oversight
 - a. Document all discrepancies as compliance concerns
2. Obtain the Corrective Action Plans/Log to verify indirect corrective actions are being documented and managed.
 - a. Document all discrepancies as compliance concerns

Interview Questions

None

4.A.10 Are indirect policies and the system description consistent with the Disclosure Statement?

Discussion

All contractor indirect policies, accounting procedures and the EVM SD must be consistent with the Disclosure Statement (required by Public Law 100-679) since the Disclosure Statement is the government approved disclosure from the contractor for their cost accounting practices. However, the contractor may get temporary authorization from the government for changes to the Disclosure Statement, and these must be formally documented and followed until the Disclosure Statement can be updated and approved.

Impact of Noncompliance

Failure to provide consistent policies and procedures could lead to inconsistent management control of indirect costs and their impact to the EAC – ultimately leads to potential cost overruns growth to the project.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Obtain the contractor's EVM SD and Accounting Policies and Procedures and verify they are consistent with the CAS Disclosure Statement. Obtain any formally documented temporary authorization of changes. Note: the intent here is that the documents are "consistent" not that they are identical.
 - a. Document all discrepancies as compliance concerns

Interview Questions

None

Guideline 4 – Typical Artifacts Common to the QE LOIs

- Organization chart identifying managers responsible for indirect cost control
- EVM SDEVMSD
- Contractor's approved Disclosure Statement
- Accounting Policies and Procedures (written)
- Applicable Audit Reports (such as Indirect/ODC internal control review and annual overhead submission audits)
- Chart of accounts (summary type listing identifying the account numbers/account titles contained in the general ledger)
- Detail level overhead budgeting policies and procedures
- Employee responsibility, assignment, authority of duties
- Job descriptions, task assignments, control assignments

Guideline 13 - Establish Overhead Budgets

Establish overhead budgets for each significant organizational component of the company for expenses, which will become indirect costs. Reflect in the project budgets, at the appropriate level, the amounts in overhead pools that are planned to be allocated to the project as indirect costs.

The guideline is further defined by QE LOI defined below.

QE LOI Guideline 13

13.A.1	Are indirect budgets established and projected, annually at a minimum, for each organization which has authority to incur indirect costs?
13.A.2	Are overhead budgets and costs managed according to the disclosure statement properly classified (for example; engineering overhead, Capital Equipment, Construction, Fringe Benefits, G&A, etc.)?
13.A.3	Are Indirect budgets established annually based on facility wide firm and potential business base and projected in a rational and consistent manner?
13.A.4	Are the accounting cost categories within indirect pool defined, budgeted and have a basis of estimate?
13.A.5	Are overhead projections adjusted in a timely manner to reflect changes in the current projected base, changes in the nature of the overhead requirements, and changes in the overhead pool and/or organization structures?
13.A.6	Are Indirect budgets incorporated into the PMB in concert with documented processes and current rates?

13.A Summary – Establish Overhead Budgets

The overall value of establishing indirect budgets lies in the ability of company management to manage cost that cannot be directly assigned to individual cost objects (products). By comparing actual indirect expenses to established indirect budgets, the company can determine if the absorption of indirect expenses based on existing documented allocation schemes is on track or if allocation rates will need to be adjusted. The accurate assignment of indirect expenses assures each project will receive the appropriate allocation of indirect costs.

The contractor must establish indirect (overhead, burden, COM, and G&A expense) budgets at the appropriate organizational level for each pool and cost sub-element. It is important because indirect costs can account for a major portion of the cost of any project. The budgetary control and management of this category of cost cannot be overlooked or minimized. Indirect budgets on the project are established and planned with the

established direct budgets consistent with the method by which allocation of indirect costs will ultimately be made to the project. This methodology is normally described in the organization's accounting procedures.

13.A.1 Are indirect budgets established and projected, annually at a minimum, for each organization which has authority to incur indirect costs?

Discussion

Each functional organization which has the authority to incur indirect costs must be accountable for the establishment, maintenance, and control of its own indirect budget. This indirect budget must be established well in advance of any actual indirect incurrence and will represent a planned baseline to measure actual indirect expenditures against. These indirect budgets are typically established on an annual basis, which is the minimum for effective cost control.

Impact of Noncompliance

Without establishment of indirect budgets on a regular basis, the contractor has no ability to establish indirect rates and properly allocate indirect costs.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify indirect budgets are established and projected, annually at a minimum, for each organization which has authority to incur indirect costs
 - a. Obtain the contractor's Disclosure Statement and detailed indirect procedures.
 - b. Review the definition of indirect expenses, overhead pools (including their composition), and the bases for allocation to the contract.
 - c. Ensure they describe the procedures for establishing indirect budgets, annually at a minimum, for each organization that has authority to incur indirect costs.
 - d. Verify the procedures specify each organization that has authority to incur indirect costs.
 - e. Ensure the contractor's EVM SD describes the requirement to establish annual indirect budgets. Note this may be a general statement with a reference to the detailed accounting procedures.
 - f. Obtain the contractor's internal reports to verify indirect budgets have been established and at what level and organization.

- g. Obtain the initial budget for the current fiscal year. Review the budget document to ensure the annual budgeting cycle is implemented no later than the start of the fiscal year.
- h. Review the annual budgeting process to ensure that the kickoff and budget was developed prior to the beginning of the fiscal year.
- i. Document all discrepancies as compliance concerns

Interview Questions

None

13.A.2 Are overhead budgets and costs managed according to the disclosure statement properly classified (for example; engineering overhead, Capital Equipment, Construction, Fringe Benefits, G&A, etc.)?

Discussion

The contractor has the responsibility to propose overhead budgets, properly classify costs, account for these budgets, and distribute actual overhead costs in accordance with the Government approved Disclosure Statement in accordance with GAAP (Generally Accepted Accounting Principles). There must be clear definitions for each category of indirect costs, and these must be mutually exclusive.

If overhead budgets and costs are not properly classified and handled consistently, there is a tendency for inequity to exist in the allocation of costs among the projects. It is important to ensure that overhead costs are equitably distributed to each customer.

Impact of Noncompliance

If overhead budgets and costs are not properly classified and handled consistently, per the Disclosure Statement, there is a tendency for inequity to exist in the allocation of costs among the projects which could lead to large year-end adjustments.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify overhead budgets and costs are managed according to the disclosure statement and are properly classified (for example; engineering overhead, Capital Equipment, Construction, Fringe Benefits, G&A, etc.).
 - a. Obtain the contractor's Disclosure Statement and Accounting Procedures and determine the classification of the overhead budgets and indirect costs.

- b. Obtain the contractor's internal budget reports to verify indirect budgets have been established and are properly classified according to the Disclosure Statement and Accounting Procedures.
- c. Document all discrepancies as compliance concerns

Interview Questions

None

13.A.3 Are Indirect budgets established annually based on facility wide firm and potential business base and projected in a rational and consistent manner?

Discussion

It is imperative that the contractor's overhead budgets be established using a rational basis of projected future business activity. The contractor's basis for establishing its contract overhead budgets must take into account the continuation of existing business and the anticipated change of existing business based on market expectations. The contractor's facility-wide business base is extremely sensitive to market conditions such as a loss of existing contracts/projects, the receipt of unanticipated contracts/projects, and the growth or shrinkage of existing markets associated with political, social, economic or environmental conditions.

Changes in the direct business base may significantly affect the associated overheads. The contractor must establish overhead budgets on a facility-wide basis at least annually and reflect the best estimate of the future business base. Since overhead budgets are applied to future periods, and reflected as an integral part of project's EAC, it is necessary for these overhead budgets to be periodically reviewed and revised to reflect changes in the contractor's anticipated business base.

The contractor establishes indirect rates for the current year and a specific number of years and documents these as Forward Pricing Rate Proposed (FPRP). When approved by the DOE's chief financial officer (CFO), these rates are then referred to as the Forward Pricing Rate Agreement (FPRA). Should these rates not cover the entire duration of a specific project, the contractor must project the rates for the out years, based on sound estimates for indirect pools and bases.

Impact of Noncompliance

Failure to establish indirect budgets annually based on facility wide firm and potential business base and projected in a rational and consistent manner could lead to inaccurate EACs and impact DOE funding of the project.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify indirect budgets are established annually and based on the projected business base.
 - a. Obtain the contractor's Disclosure Statement and Accounting Procedures and review the procedures for establishing indirect budgets as stated above.
 - b. Obtain copies of the Forward Price Rate Proposal (FPRP) disclosure statement and the most current Forward Pricing Rate Agreement (FPRA) to review and verify that overhead rates are established yearly at a facility. Verify the process is conducted on at least an annual basis and includes provisions for updating because of changes in business environment.
 - c. Obtain the contractor's Forward Pricing Rate procedures to determine that external market, business base and other contingencies are provided for.
 - d. Obtain any out year projections for rates beyond the FPRP or FPRA and review the basis of these projections for consistency with the FPRP or FPRA.
 - e. Obtain the contractor's internal indirect budget reports and any basis of estimate to verify indirect budgets are established annually based on facility wide firm and potential business base and projected in a rational and consistent manner
 - f. Document all discrepancies as compliance concerns
2. Verify the bases and rates for allocating costs from each indirect pool are consistently applied.
 - a. Have the contractor print out the current rate table(s) used in the EVM Cost Tool. Compare the rates to the FPRA in 1.d above. Rates should match for the ETC and may not match for the baseline.
 1. $X = \text{applied rate in EVM Cost Tool} - \text{approved rate} = \text{delta discrepancy by rate}$
 - b. Tolerance is $X = 0\%$.

Interview Questions

1. Indirect Cost Manager: How do you project your company's business volume? What is the percentage breakout by category, e.g., firm/on contract, follow on, likely to win, or less likely to win?

13.A.4 Are the accounting cost categories within indirect pools defined, budgeted and have a basis of estimate?

Discussion

Cost Categories in indirect pools are different than EOCs in the EVM Cost Tool. Indirect pool EOC's typically refer to budgeting categories and tracking elements within the

accounting system (e.g., material handling, accounting indirect labor, office supplies, etc.), hence the “accounting” cost category distinction. It is also important for the contractor to maintain a complete, up-to-date listing and description of each indirect category. This listing must be the basis for the establishment of the functional organization budgets.

It is imperative that this listing and the descriptions be complete. If all expense items are not included in the overhead budgets, incurred indirect costs will exceed the budgets and contribute to unfavorable indirect cost variances. Additional consideration should also be given to ensure that these overhead expense category items are clearly identified to eliminate the possibility of double or inconsistent accounting. This would preclude the chance of accounting for an expense item as both a direct charge and an indirect charge or inclusion in two different indirect budgets.

Each indirect cost category in must have an established budget based on a realistic basis of estimate. This estimate is typically derived by the responsible indirect manager by reviewing past budgets, past indirect cost variances, and projected needs for the appropriate year(s).

Impact of Noncompliance

If all expense items are not included in the overhead budgets, the actual indirect costs incurred on the contract will exceed the budgets and contribute to unfavorable indirect cost growth.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify indirect cost pools are defined and budgeted by element of cost and have a basis of estimate.
 - a. Obtain the latest approved Disclosure Statement and Accounting Procedures. Note all indirect cost elements that are defined.
 - b. Obtain a report from the accounting system with all of the indirect elements of cost. Reconcile the elements of cost with the Disclosure Statement.
 - c. Obtain internal accounting and budget reports to verify the indirect pools are defined and budgeted by element of cost and have a basis of estimate.
 - d. Obtain the contractor’s basis of estimate for the indirect budgets by element of costs.
 - e. Document all discrepancies as compliance concerns

Interview Questions

None

13.A.5 Are overhead projections adjusted in a timely manner to reflect changes in the current projected base, changes in the nature of the overhead requirements, and changes in the overhead pool and/or organization structures?

Discussion

Contractors normally develop new overhead projections on an annual basis. Generally these projections are reviewed and revised (up or down) on at least a semi-annual basis. Where significant changes occur in the current or projected business base that significantly affects the overhead projections, an adjustment must be made to the overhead projection. If significant changes are made that impact the allocation or charging of contract cost, a Disclosure Statement change may be needed. That would require a submission for approval of the revised Disclosure Statement.

These overhead adjustments must normally be implemented within two accounting periods (which must be specified in the EVM SD), or as agreed to by the local DOE CFO. Changes to overhead pools or organizational structures which significantly affect overhead projections, or changes in the amount of overhead services needed to support the business base, must also be implemented within two accounting periods or as otherwise agreed in consideration of the magnitude of the change.

The utilization of projected overhead rates based on an anticipated business base and commensurate overhead expenditures is intended to provide the customer with insight as to funding requirements and expected overall project cost. The contractor's system for projecting overheads must have the capability for adjustments when changes will make future projections of overheads an unrealistic allocation of indirect costs.

Note that the SD may contain only an overview of the process, while the accounting procedures generally contain a description of the detailed processes.

Impact of Noncompliance

Failure to project changes to the budget in a timely manner may directly understate the project EAC.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the EVM SD and contractor Accounting policies and procedures for indirect budgeting and cost control to ensure processes are included for (note: the location of detailed processes may be referenced in the EVM SD):
 - a. Overhead projections to be adjusted in a timely manner to reflect changes in the current projected base
 - b. Changes in the nature of the overhead requirements
 - c. Changes in the overhead pool and/or organization structures.
2. Also review the contractor's policy and procedures for conducting Forward Rate Pricing processes to ensure anticipated business base impacts are to be included.
3. Review the approved Disclosure Statement to determine if significant changes have been made that impact the allocation or charging of contract cost that would require a change to the disclosure statement be submitted for approval. If so, obtain internal reports and
 - a. Verify overhead projections were adjusted in a timely manner
 - b. Verify the changes reflected in the current direct and projected base,
 - c. Verify the changes reflected in the nature of the overhead requirements
 - d. Verify the changes reflected in the overhead pool and/or organization structuresDocument all discrepancies as compliance concerns

Interview Questions

None

13.A.6 Are Indirect budgets incorporated into the PMB in concert with documented processes and current rates (i.e., approved, provisional, proposed)?

Discussion

Just as with direct budgets, indirect budgets must be included in the PMB using the current rates to ensure the PMB represents a realistic baseline plan as specified in the Contractor's EVM SD. The most current set of rates must be used when planning the initial baseline and subsequent baseline changes. These rates may be either: forward pricing rate proposed (FPRP), forward pricing rate provisional, or forward pricing rate approved (FPRA). Should these rates not cover the entire duration of the project, the contractor must extend the rates to the out years on the same basis, using a sound estimate for the indirect pools and potential business base.

Note that these are the budgeted rates and applied to budgeted direct costs (BCWS) and also used in BCWP calculations. The "applied" rates are updated for actual costs over the course of a year and are applied to the actual direct costs for ACWP reporting. (See 19.A.2 for more information on applied rates.)

Impact of Noncompliance

Failure to include realistic indirect budgets in the PMB would invalidate the PMB as a realistic baseline plan.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the EVM SD and contractor policy and procedures for indirect budgeting and cost control to ensure processes are included for incorporating indirect budgets into the PMB (note: the location of detailed processes may be referenced in the EVM SD).
 - a. Verify the contractor has a process to ensure indirect rates are updated as necessary.
 - b. Obtain internal EVM reports (CAPs) and compare to indirect budgets and rates to verify indirect budgets are incorporated into the PMB using current rates.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

Guideline 13 – Control Account Typical Artifacts Common to the QE LOIs

- Contractor's Cost Accounting Standards Board (CASB) Disclosure Statement
- Contractor's documented process for managing indirect costs
- Forward Pricing Rate Agreement and/or Forward Pricing Rate Proposal
- Organizational structure identifying ownership responsibility and authority levels
- Organization Charts
- Chart of accounts
- Forward Pricing Forecast (including sales forecast and business base projections)
- Negotiate rate costs
- Summary control account/wp/pp plans
- Plans by functional, OBS, or by element of cost
- Indirect cost policies and procedures
- Internal project reports with indirect budgets
- Integrated project Management Report (IPMR)
- Management reports from EVM Cost Tool

Guideline 19 - Record/Allocate Indirect Costs

Record all indirect costs that will be allocated to the project.

The guideline is further defined by QE LOI defined below.

19.A.1	Is the accurate allocation of indirect costs described and defined in the contractor's CAS Disclosure Statement and cost accounting procedures?
19.A.2	Are indirect costs consistent with the indirect budgets?
19.A.3	Do actual lines of authority for incurring costs correspond to documented lines of responsibility?
19.A.4	Are indirect costs charged to the appropriate indirect pools?
19.A.5	Are the indirect rate adjustments applied consistently among all applicable projects?

19.A Summary – Record/Allocate Indirect Costs

Visibility into direct and indirect costs is essential for successful management of a project. It is important to have a documented process and organizations established specifically to manage and control indirect costs. Indirect costs are for common activities that cannot be identified specifically with a particular project or activity and must typically be budgeted and controlled separately at the functional or organization managerial level. The CAS disclosure statement must identify the allocation base and indirect cost pools by functional element of cost.

The following activities are associated with the recording and allocation of indirect costs:

- Record all incurred indirect costs for the project in the accounting system.
- Allocate them to the recorded direct costs per the documented procedure to ensure that all projects benefiting from the indirect costs receive the appropriate allocation.
- If incurred indirect costs vary significantly from budgets, periodic adjustments must be made to prevent the need for a significant year-end adjustment. (See Guidelines 13.a.5).
- Indirect cost allocation processes must ensure management responsibility for indirect cost management is aligned with the authority to manage indirect costs to support effective cost control.

19.A.1 Is the accurate allocation of indirect costs described and defined in the contractor's CAS Disclosure Statement and cost accounting procedures?

Discussion

The contractor has the responsibility to describe the process and procedures for the accurate allocation of indirect costs in their Disclosure Statement and/or cost accounting procedures. If the contractor does not provide these procedures there may be a tendency for inequity to exist in the application of costs among contracts. It is important to ensure that indirect costs are equitably distributed to each customer, complying with the defined basis of allocation in the Disclosure Statement.

Impact of Noncompliance

Failure to define the indirect cost structure, burden base and the type of cost contained in each defined rate could cause indirect costs to be allocated, budgeted and collected in an inconsistent manner and can lead to a lack of indirect cost control and serious cost overrun problems for projects.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the EVM SD, Disclosure Statement and Accounting Procedures to verify that cost accounting procedures provide for the accurate allocation of indirect costs.
2. Review the Disclosure Statement to ensure that the basis of allocation for each indirect pool is clearly defined.
3. Document all discrepancies as compliance concerns

Interview Questions

None

19.A.2 Are indirect costs consistent with the indirect budgets?

Discussion

In guideline 13 the indirect budgeting process was discussed. This QE LOI ensures the actuals are accrued consistent with the budget. There are two aspects to this: allocation at the same level where the overhead budget was established, and secondly, correct recording in the indirect accounts. Allocating indirect costs to a project consistent with the level where overhead budgets have been established facilitates analysis of overhead variances (i.e., budgeted values for indirect costs versus the actual indirect costs allocated) and potential management action(s) to control costs. For example, if a budget category is defined as Computer Purchase all indirect computer purchases must be charged in the budgeted account. Both aspects support meaningful analysis of significant variances as discussed in guideline 24.

Impact of Noncompliance

If the contractor's system does not accumulate indirect costs at the same level where indirect costs are budgeted, cost comparison analysis and potential corrective action cannot be appropriately made.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify indirect costs are consistent with the indirect budgets.
 - a. Obtain internal indirect cost reports for the last three months and verify that indirect costs are correctly accumulated within the correct category.
 - b. Ensure indirect costs are accumulated at the same level where the indirect budgets are applied.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

19.A.3 Do actual lines of authority for incurring costs correspond to documented lines of responsibility?

Discussion

This QE LOI focuses on the overhead lines of authority and corresponding lines of responsibility? Indirect Cost allocation processes must ensure management responsibility for indirect cost management is aligned with the authority to manage indirect costs to support effective cost control. For example, if Manufacturing Engineering functionally reports to the Manager of the Engineering Department but charges indirect costs to a Manufacturing "burden" pool, the lines of authority and responsibility are not consistent. Control of the contribution to the manufacturing pool by manufacturing engineers would be extremely difficult since the Manufacturing Manager has no control or authority over the Manufacturing Engineering personnel.

An additional factor to consider is the issue of fixed versus variable indirect costs. Fixed indirect costs are those which remain relatively constant on a total basis, as production volume is varied over the short run. Examples of such fixed costs are fire insurance, machinery depreciation, rent, and property taxes. These costs remain relatively fixed over a relevant range of production. Of course, if production requirements change "significantly" from this relevant range, even in the short run, the fixed cost assumption could become outdated. Variable indirect costs on the other hand, are those which

fluctuate directly and proportionately on a total basis with changes in production volume over the short run. Examples of such variable costs include indirect labor, indirect materials, and sales/marketing functions.

Each of these types of indirect costs poses unique problems for those who would control and authorize their use. In particular, variable indirect costs can be more challenging to control, requiring additional management oversight by the established lines of authority. Hence, when establishing procedures for aligning overhead authority with overhead responsibility, the contractor must specifically address the problem of fixed versus variable overhead costs and outline procedures for controlling each type without violating the precepts of direct lines of authority.

Impact of Noncompliance

Failure to align the lines of authority with lines of responsibility for managing indirect costs results in poor indirect cost control and cost variances.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify actual lines of authority for incurring costs correspond to documented lines of responsibility.
 - a. Obtain a copy of the organizational responsibility documented in accounting procedures and compare with budget reports from the accounting system.
 - b. Are the organizations charging in the accounting report consistent with the organization responsible for the budget?
2. Verify that specific definitions exist in the contractor's accounting manual or procedures that identify fixed versus variable indirect costs and that the procedures describe how these costs are to be controlled.
3. Review the overhead budgets for the current year. Look for obvious examples of fixed versus variance type costs.
 - a. Is the fixed type planned consistently over the year?
 - b. Are the variable type costs planned appropriately (versus level loaded) over the year consistent with the requirements? See the interview question below.
4. Document all discrepancies as compliance concerns

Interview Questions

Accounting Personnel: Can you please show me how variance versus fixed type indirect costs are managed?

19.A.4 Are indirect costs charged to the appropriate indirect pools?

Discussion

The contractor has the responsibility through internal audits to assure that indirect charges are properly recorded throughout the accounting structure. The contractor also has the responsibility to assure that such costs are not duplicated (i.e. that they are not charged to more than one pool nor charged to both an indirect pool and at the same time to a direct/allowable cost element). Because of the nature of pooled costs, entry errors are more difficult to detect than with direct costs. Periodically, reviews must be made to assure that indirect costs are being charged to the appropriate indirect pools and by the appropriate incurring organization.

Impact of Noncompliance

The lack of clear definition of organizational assignments and authority level for each indirect pool/category can lead to a lack of indirect cost control and to serious cost overrun problems for projects.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Review the contractor's internal audit reports to assess whether indirect costs are applied properly without duplication.
 - a. Examine an accounting cost element report.
 - b. Ensure that the cost elements are charged to the appropriate pools without duplication.
 - c. There must be no discrepancies.

Interview Questions

None

19.A.5 Are the indirect rate adjustments applied consistently among all applicable projects?

Discussion

The allocation of cost to a product, contract or other cost objective must be the same for all similar objectives. That is, if direct labor dollars are the basis for allocating overhead on one contract, they must be the basis across all contracts. Also, if indirect rate adjustments are being applied to one project, they must be applied consistently among all applicable projects. Unless identical bases and rates for allocating costs among projects

are utilized for allocations from indirect cost pools, double accounting or over-allocation and under-allocation of the pool costs is likely to occur.

Furthermore, the contractor has the responsibility to periodically review the allocation formula utilized for indirect costs, i.e., the applied indirect rate, to assure that the applied rate reasonably reflects the actual indirect costs being incurred. If incurred indirect costs vary significantly from the budgeted indirect pool expenses, periodic adjustments must be made to prevent the necessity for a significant year-end adjustment.

Indirect cost adjustments can be made on a monthly basis by utilizing cumulative data information rather than single-month data as the basis for allocation of indirect costs to contracts. Unless these periodic adjustments are made when actual indirect cost rates significantly vary from the budgeted rates, contractor data being generated by the performance measurement system will be distorted.

Impact of Noncompliance

The failure to apply indirect rate adjustments consistently among all applicable projects over and/or under-allocation of the pool costs is likely to occur and contractor data being generated by the EVM system will be distorted which could impact the project EAC.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the contractor has a process to ensure indirect rates are updated as necessary.
 - a. Review the EVM SD and Accounting Procedures to verify that a process is in place to update indirect rates as necessary and that the updated rates are applied consistently.
 - b. Review the current FPRA and verify when and how the contractor is updating rates and making periodic adjustments to prevent significant year-end adjustments.
 - c. Obtain internal reports to verify indirect rates are being updated and applied consistently among all projects.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

Guideline 19 – Control Account Typical Artifacts Common to the QE LOIs

- Contractor's Cost Accounting Standards Board (CASB) Disclosure Statement
- Cost Collection Account Structure
- WBS/cost collection mapping
- WBS (roll-up scheme)
- Control Account Indirect Cost Reports
- Contractor Budgets and/or Forward Pricing Forecasts
- Forward Pricing Rate Agreement and/or approved billing rates
- Incurred cost reports
- General Ledger
- EVM SD and lower level accounting procedures
- Contractor Accounting Manual section regarding recording of indirect costs

Guideline 24 - Analyze Indirect Cost Variances

Identify budgeted and applied (or actual) indirect costs at the level and frequency needed by management for effective control, along with the reasons for any significant variances.

The guideline is further defined by QE LOI defined below.

24.A.1	Are there variance thresholds established for indirect pool variance analysis and reporting?
24.A.2	Are indirect rate pool variances that exceed a threshold documented as to the cause and impact, and any necessary corrective action?
24.A.3	Are the results of indirect variance analysis provided to the appropriate level of project management on a routine basis?
24.A.4	Does the contractor's cost system have the capability to measure indirect variances by the elements of expense applicable to each indirect cost?
24.A.5	Does the responsible indirect cost manager identify root cause(s) (e.g., usage variance, change in business volume, or rate variance because of a change in the direct base) for indirect variance analysis?
24.A.6	Does the contractor in the annual indirect budgeting process consider performance from the previous year?
24.A.7	Do CAMs address the indirect component of cost variance?

QE LOIs Repeated With Discussions

24.A Summary – Analyze Indirect Cost Variances

Ongoing indirect cost analysis provides visibility into potential indirect cost overruns and the opportunity to develop and implement management action plans to meet project objectives.

Indirect rate forecast and control are crucial to meeting project cost objectives. This guideline requires a monthly indirect cost analysis to be performed by those assigned responsibility, comparing indirect budgets to indirect actual costs and explaining the cause of resultant variance(s). The importance of analyzing indirect cost performance requires the exercise of maximum discipline in following the established indirect cost control procedures. The results of indirect analysis are provided to project and business managers for their use in forecasting the impact to the project EAC.

24.A.1 Are there variance thresholds established for indirect pool variance analysis and reporting?

Discussion

Indirect pools such as Overhead, Burdens, G&A, or COM must each have thresholds established for indirect performance of the base and expenses. These thresholds may be established annually or formally documented in an accounting policy. The unique aspect of indirect analysis is that rates are typically an annual cycle with year-end adjustments to zero. Therefore, logically, the thresholds may vary by month within the year to accommodate typical timing differences, with the later months having tighter thresholds. Thresholds for indirects are also very different than project control account thresholds. An example with an annual cycle from January to December:

Month	Threshold
January	10%
February	9%
March	9%
April	8%
May	8%
June	6%
July	2%
Aug	2%
Sept	2%
Oct	2%
Nov	2%
Dec	2%

Impact of Noncompliance

Failure to document thresholds can indicate a risk for large adjustments to project costs and result in funding shortages.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify that thresholds are established for each pool defined in the CAS Disclosure Statement
 - a. Obtain the disclosure statement. Verify the number and type of indirect cost pools.
 - b. Interview the accounting staff responsible for indirect identified in Guideline 1. Ask to see the thresholds for each pool in the current year.
 - c. Review the thresholds for the pool for reasonableness, reviewing tolerance for the size and scope of the pool.
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

24.A.2 Are indirect rate pool variances that exceed a threshold documented as to the cause and impact, and any necessary corrective action?

Discussion

Documentation is required for indirect variances at the pool level that exceed a threshold. The variance must include analysis into to a problem of expense (numerator) or base (denominator) or both that are comprise the rate variances. The analysis of expense or base impacts must address the components that are causing the variance – also known as line items. Typically the categories are the same as in the budgeting process defined in Guideline 13.

Elements to address include the cause(s) of the variance, the impact to the overall pool, and corrective action. This may be accomplished with a variance analysis form or documented meeting minutes as long as the same elements are present.

This analysis provides project management visibility into the reasons for potential or realized indirect cost performance deviations that contribute to the contract's overall cost and impacts to the ETC. The analysis also enables the management team to take corrective actions to mitigate their impact

Impact of Noncompliance

Lack of variance analysis of problems is a contributor to large year-end rate adjustments and uncontrolled cost overruns.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify all indirect variances that exceed a threshold are documented.
 - a. Select 1-3 indirect pools and interview the manager responsible as identified in Guideline 4.
 - b. Examine the thresholds identified for the pool(s) selected
 - c. Examine the latest cost reports for the base and expense categories. Do any rates exceed thresholds?
 - d. Review the documented analysis to verify contents:
 1. The cost elements driving or causing the variance
 2. Pool versus base cost analysis (refer to 24.A.5)
 3. Impact to year end rates
 4. Corrective action to reduce or forecast the impacts.
 - e. Document all discrepancies as compliance concerns

Interview Questions

None

24.A.3 Are the results of indirect variance analysis provided to the appropriate level of project management on a routine basis?

Discussion

From the project perspective, one of the benefits of indirect analysis is gaining an understanding of the potential impacts. Rates can be significant drivers of overall project costs. This QE LOI ensures that the indirect variance analysis is provided to the capital assets projects to support the EAC update process. Typically the appropriate level of management would be the project manager and/or project controls analyst.

Impact of Noncompliance

Failure to integrate indirect analysis with project level EAC analysis can significantly understate total project costs.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify the PM receives the results from indirect variance analysis that exceeds a threshold.
 - a. Taking the results from test 24.A.2.1, interview the project manager of the project(s) being reviewed. Verify that the project manager or project controls analyst received notification of the indirect pool analysis results.
 - b. Examine the date of the notification to verify that the project manager or project controls analyst received it within 30 calendar days or one reporting period of the analysis.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

24.A.4 Does the contractor's cost system have the capability to measure indirect variances by the elements of expense applicable to each indirect cost?

Discussion

Since budgets are established for the indirect pools by cost element or category and actual costs are accumulated in a similar manner, the contractor's system must measure cost variances at that level. The expectation is that variances are calculated against any budgeted type of indirect expense. Without the variances by budgeted indirect cost elements, the compliance with 24.A.2 is not possible.

Impact of Noncompliance

Failure to understand indirect cost elements means that significant variances are not being managed.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Trace the cost elements between the disclosure statement, budgeting documentation, and current cost reports to verify consistency and availability.
 - a. For the significant pools examine the disclosure statement. Note any cost elements that are described in the indirect pools.
 - b. Examine the variance reports for each significant pool. Ensure that actual costs are compared to budgets for the elements of cost and variances are calculated at that level.
 - c. Document all discrepancies as compliance concerns

Interview Questions

None

24.A.5 Does the responsible indirect cost manager identify root cause(s) e.g., usage variance, change in business volume, or rate variance because of a change in the direct base) for indirect variance analysis?

Discussion

Root cause analysis for indirect cost is different than project analysis. Typically, indirect variances can be caused by one or more factors listed below:

- Rate, because of cost variances for indirect pool expenses
- Volume:
 - Usage; this would be changes in the base such as hours
 - Change in Business Volume. This is typically new or cancelled work that significantly changes the base that the expenses are allocated against.
 - Other impacts to the indirect base units.

Significant differences between the actual (or applied) rate and the baseline rates are usually attributed to two major factors: a change in the indirect cost pool (rate variance) and a change in the volume (volume variance). The contractor must isolate and analyze these cost deltas (rate versus volume) and provide an explanation.

In the sample calculations shown below, the budgeted indirect rate is 192% and the applied rate for ACWP is 177%.

Calculate Rate Variance (RV)

$$\begin{aligned}
 RV &= (\text{Budgeted rate} - \text{Applied rate}) \times \text{Direct ACWP} \\
 &= (192\% - 177\%) \times \$425 \\
 &= +\$64
 \end{aligned}$$

Calculate Volume Variance (VV)

$$\begin{aligned}
 VV &= (\text{Direct BCWP} - \text{Direct ACWP}) \times \text{Budgeted Rate} \\
 &= (\$300 - \$425) \times 192\% \\
 &= -\$240
 \end{aligned}$$

Total Cost Variance (CV)

$$\begin{aligned}
 \text{Total CV} &= RV + VV \\
 &= +\$64 + -\$240
 \end{aligned}$$

= -\$176

Impact of Noncompliance

Failure to perform root cause analysis of indirect costs can result in additional cost overruns and prevent accurate and effective performance management.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify that root cause analysis for indirect costs separately identifies rate vs. volume.
 - a. Examine the indirect variance analysis reports for 3 months to determine if rate vs volume is identified and discussed.
 - b. Review the IPMR/CPR Format 5 summary level analysis for a written analysis of indirect costs.

Interview Questions

None

24.A.6 Does the contractor, in the annual indirect budgeting process, consider performance from the previous year?

Discussion

This QE LOI looks at the budgeting process for the next fiscal year. It must consider past performance in establishment of targets for the following year. For example if computer expenses showed a 50% cost variance last year, this must be considered in projections for the current budget year, unless the variance was not expected to occur again.

Impact of Noncompliance

Failure to review the performance of the previous year in the budgeting cycle for the next one can ensure that the same errors and poor performance continues.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Ensure performance is considered in the following budget cycle
 - a. Obtain the budget kickoff package used in the previous years.
 - b. Is the previous year performance considered in the budgeting kickoff or other report provided?
 - c. Do indirect cost managers with budget responsibility consider indirect variance analysis and trends from last period as applicable?
 - d. Document all discrepancies as compliance concerns

Interview Questions

None

24.A.7 Do CAMs address the indirect component of cost variance?

Discussion

This QE LOI is directed at the project CAM and not the indirect manager. The contractor must establish the responsibility for analysis of indirect costs on the project, either at the CAM level or project control level. The CAMs must separately identify the contribution of direct vs. indirect variances in variance analysis reports with information provided to them by project controls, but they normally do not have the insight to analyze indirect costs. Typically, the responsibility to explain indirect cost variances on a project is given to a project controls analyst. The CAM must understand the fact that indirect costs impact the cost of his/her control account effort and explain how much of the cost variance is because of direct vs. indirect costs. Analysis of indirect variances is normally explained on a project level as part of the summary analysis in Format 5 of the IPMR/CPR.

Impact of Noncompliance

Failure to analyze the indirect portion of the project understates the analysis of total project cost and leads to cost overruns.

Verification Steps

Data Analysis (Automatable)

None

Artifact Traces between Documents

1. Verify indirect cost variances are identified separately in the CAM variance analysis.

- a. Review the CAM internal variance analysis reports for the past month to verify that indirect variance is separately identified as required.
- b. Review the summary level analysis of the IPMR/CPR to verify that the indirect cost variances have been analyzed and documented.
- c. Document all discrepancies as compliance concerns

Interview Questions

None

Guideline 24 – Control Account Typical Artifacts Common to the QE LOIs

- Contractor's Disclosure Statement
- Accounting Policies and Procedures
- Indirect cost variance analyses
- Indirect Variance Analysis
- Indirect Variance Thresholds
- Indirect cost reports
- Indirect budget documentation
- Rate kickoff packages
- Project Variance Analysis reports

APPENDIX A – ACRONYMS AND ABBREVIATIONS

%C	Percent Complete
ACWP	Actual Cost of Work Performed
APM	Acquisition and Project Management
AUW	Authorized Unpriced Work
BAC	Budget at Complete
BCP	Baseline Change Proposal
BCR	Baseline Change Request
BCWP	Budgeted Cost for Work Performed
BCWR	Budgeted Cost for Work Remaining
BCWS	Budget Cost for Work Scheduled
BL	Baseline
BOE	Basis of Estimate
BOM	Bill of Material
CA	Control Account
CAM	Control Account Manager
CAP	Control Account Plan
CBB	Contract Budget Base
CD	Critical Design
CDRL	Contract Data Requirements List
COM	Cost of Money
CP	Critical Path
CPR	Contract Performance Report
CUM	Cumulative
CUR	Current
CWBS	Contract Work Breakdown Structure
DOE	Department of Energy
EAC	Estimate at Complete
EIA-748	Electronic Industries Association - 748
EOC	Elements of Cost
ETC	Estimate to Complete
EV	Earned Value
EVM	Earned Value Management
EVMS	Earned Value Management System
EVT	Earned Value Techniques
FF	Finish-Finish
FPD	Federal Project Director
FPRA	Forward Pricing Rate Agreement
FPRP	Forward Pricing Rate Proposal
FS	Finish-Start
G&A	General and Administrative

GFE	Government Furnished Equipment
GFI	Government Furnished Information
GFM	Government Furnished Material
HDV	High Dollar Value (material)
IH	Interpretation Handbook (EVM)
IMP	Integrated Master Plan
IMS	Integrated Master Schedule
IPMR	Integrated Project Management Report
IPT	Integrated Product Team
KPP	Key Performance Parameters
LDV	Low Dollar Value (material)
LOE	Level of Effort
LOI	Lines of Inquiry (See Qualifying Expectation)
M&O	Management & Operating Contract (M&O) Contractor
MMAS	Material Management and Accounting System
MR	Management Reserve
MRP	Manufacturing Resource Planning
NTE	Not to Exceed
OBS	Organizational Breakdown Structure
ODC	Other Direct Costs
OH	Overhead
OTB	Over Target Baseline
OTS	Over Target Schedule
PARSII	Project Performance and Reporting System
PARSIIE	Project Performance and Reporting System Version E
PEP	Project Execution Plan
PERT	Project Evaluation and Review Technique
PM	Project Manager
PMB	Performance Measurement Baseline
PMOA	Project Management and Oversight Assessments
PO	Purchase Order
POD	Plan of the day
POP	Period of Performance
POW	Plan of the week
PP	Planning Package
PR	Purchase Request
PWS	Performance Work Statement
QBD	Quantifiable Backup Data
QE	Qualifying Expectations
RAM	Responsibility Assignment Matrix
SD	System Description
SF	Start-Finish

SLPP	Summary Level Planning Package
SM	Schedule Margin
SOW	Statement of Work
SS	Start-Start
SVT	Schedule Visibility Task
TAB	Total Allocated Budget
TPC	Total Project Costs
UB	Undistributed Budget
VAR	Variance Analysis Reports
VAC	Variance at Complete
WAD	Work Authorization Document
WBS	Work Breakdown Structure
WP	WP

APPENDIX B – DEFINITIONS AND SOURCES

Definitions

Percent Complete (%C)	Varies. In the schedule days calculation it is (1-remaining duration)/Total Duration. For BCWP calculations it is the technical accomplishments expressed as total technical accomplishments completed/total technical accomplishments planned. (2)
Actual Cost of Work Performed (ACWP)	The costs actually incurred and recorded in accomplishing work performed; also referred to as Actual Cost (AC). (1)
Acquisition and Project Management (APM)	DOE term part of Office of Acquisition and Project Management (PMOA) (unique)
Authorized Unpriced Work (AUW)	Work that the customer has authorized to be performed, but for which a formal proposal has not been negotiated. (2)
Budget at Complete (BAC)	The sum of all budgets established for the contract through any given WBS/OBS level. When associated with a level it becomes control account BAC, Performance Measurement Baseline BAC, etc. (See Total Allocated Budget.) (2)
Baseline Change Proposal (BCP)	A BCP represents a change to one or more of the elements of a project's Performance Baseline (PB): Total Project Cost (TPC), Critical Decision 4 (CD-4) completion date, or some feature of the projects scope/Key Performance Parameters (KPP), and must be approved by the applicable Acquisition Executive. (1)
Budgeted Cost for Work Performed (BCWP)	The value of completed work expressed in terms of the budget assigned to that work. (1)
Budgeted Cost for Work Remaining (BCWR)	The budgeted value of work remaining. It is calculated as BAC minus the BCWPCum (i.e. $BCWR = BAC - BCWPCum$). Note: ETC is the estimate to complete the BCWR. (1)
Budget Cost for Work Scheduled (BCWS)	The time-phased budget plan for work currently scheduled, also referred to as Planned Value (PV).. (1)
Baseline (BL)	See Performance Measurement Baseline
Basis of Estimate (BOE)	A part of a Cost Estimating Package or stand-alone document supporting a cost estimate. The BOE should describe the design basis, the planning basis (significant features and components, proposed methods of accomplishment, and proposed project schedule), the risk basis, supporting research and development requirements (important when new technologies are contemplated for certain components, equipment or processes), special construction or operating procedures, site conditions, the cost basis, and any other pertinent factors or assumptions that may affect costs. (1)
Bill of Material (BOM)	A listing of material items required to complete the production of a single unit. When actual or expected prices are applied, it becomes the Priced Bill of Materials (PBOM). (2)
Control Account Manager (CAM)	An individual within the contractor's organizational structure that has been assigned the authority and responsibility to manage one or more CAs. (See Control Account definition) (DOD Earned Value Implementation Guide, Oct 2006) (3)
Control Account Plan (CAP)	A CAP is a time phased report of the budget spread by element of

	cost for the control account. (1)
Contract Budget Base (CBB)	The sum of the negotiated contract cost plus the estimated cost of authorized unpriced work. This represents the total amount of performance measurement budget that may be allocated to contract work. (See Total Allocated Budget). (2)
Critical Decision (CD)	A formal determination made by the SAE or AE at a specific point during the project that allows the project to proceed to the next phase or CD. (1)
Contract Data Requirements List (CDRL)	The standard format for identifying potential data requirements in a solicitation, and deliverable data requirements in a contract. The purpose of the CDRL is to provide a standardized method of clearly and unambiguously delineating the Government's minimum essential data needs. (2)
Cost of Money (COM)	An imputed cost determined by applying a cost-of-money rate to facilities capital employed in contract performance or to an investment in tangible and intangible assets while they are being constructed, fabricated or developed for the contractor's own use. (http://www.lectlaw.com/def/c187.htm) (3)
Contract Performance Report (CPR)	Contract cost and schedule performance data that is used to identify problems early on an acquisition contract and forecast future contract performance in Earned Value Management (EVM). (Source: AcqNotes.com) Report content was prescribed by DOD Data Item Description DI-MGMT-81466A. (DOE G 413.3-10A) (Note: The Integrated Program Management Report (IPMR) Data Item Description (DOE Version) integrates the CPR and the IMS.) 2. Contractually required reports, prepared by the contractor, containing performance information derived from the internal EVMS. Provides status of progress on the contract. (1)
Critical Path (CP)	A sequence of discrete WPs and planning packages (or lower level tasks/activities) in the network that has the longest total duration with the least amount of total float/slack through an end point that is calculated by the schedule software application. (2)
Cumulative (CUM)	The summation to date – can be BCWS, BCWP, ACWP or ETC reference. Is the opposite of current period. (unique)
Current (CUR)	The type of cost for the current accounting month only. The summation of current period from the beginning is cumulative costs. (unique)
Contract Work Breakdown Structure (CWBS)	The complete WBS for a contract. It includes the DoD approved WBS for reporting purposes and its discretionary extension to lower levels by the contractor, in accordance with government direction and the contract work statement. It provides for the product-oriented decomposition of contract work into major elements that include all the hardware, software, data and/or services that are the responsibility of the contractor. (2)
Data Date	Also known as status date – the date of the current period close that status is captured through. For the monthly earned value cycle it is the relevant month-end date for status. (unique)
Department of Energy (DOE)	Reference for DOE as a whole (unique)

Driving Path	The longest sequence of discrete tasks/activities from time-now to a selected interim contract milestone. Discrete tasks/activities on the driving path have the least amount of total float/slack to the interim contract milestone. Driving path may not be part of the contract critical path. (2)
Estimate at Complete (EAC)	Actual cost of work completed to date plus the predicted costs and schedule for finishing the remaining work. The current estimated total cost for project authorized work. EAC equals the actual cost to a point in time plus the estimated costs to completion. (1)
Electronic Industries Association – 748 (EIA-748)	Also known as “Guidelines”, “Standards”. High level principles that serve as the backbone to the DOE EVM IH. EIA – 748 was a legacy title. They define the principles of an earned value requirement. It is the EIA-748 that is placed on contract and interpreted by this document. (unique)
Elements of Cost (EOC)	Product costs are decomposed into the elements of cost. These elements are comprised of labor, materials, other direct costs and overhead. EOCs represent the cost of products that are typical across industry. (2)
Estimate to Complete (ETC)	Estimate of costs to complete all authorized work from a point in time to the end of the program/project or task. (1)
Earned Value (EV)	See <i>Budgeted Cost for Work Performed (BCWP)</i> .(3)
Earned Value Management (EVM)	A program management technique for measuring program performance and progress in an objective manner. (2)
Earned Value Management System (EVMS)	An integrated management system that integrates the work scope, schedule, and cost parameters of a program in a manner that provides objective performance measurement data. It measures progress objectively with earned value metrics; accumulates direct costs; allows for analysis of deviations from plans; facilitates forecasting the achievement of milestones and contract events; provides supporting data for forecasting of estimated costs; and fosters discipline in incorporating changes to the baseline in a timely manner. (2)
Earned Value Techniques (EVTs)	A specific technique (e.g., Milestone Method, Percent Complete, 50/50, 0/100, Units Complete, Apportioned Effort, LOE, etc.) selected to represent the measurement of work scope progress and accomplishment in a WP. (2)
Finish-Finish (FF)	Logical relationship between two project activities in which the completion of the work for a successor activity is dependent on the completion of the work for a predecessor activity. (1)
Forward Pricing Rate Agreement (FPRA)	An agreement between a contractor and a government agency in which certain indirect rates are established for a specified period of time. These rates are estimates of costs and are used to price contracts and contract modifications. (1)
Forward Pricing Rate Agreement (FPRA)	A written agreement negotiated between a contractor and the Government to make certain rates available during a specified period for use in pricing contracts or modifications. These rates represent reasonable projections of specific costs that are not easily estimated for, identified with, or generated by a specific contract, contract end item, or task. These projections may include rates for such things as labor, indirect costs, material obsolescence and

	usage, spare parts provisioning, and material handling. (1)
Finish-Start (FS)	Logical relationship between two project activities in which the initiation of the work for a successor activity is dependent on the completion of the work for a predecessor activity. (1)
Freeze Period	A period of time when baseline changes are limited. See Guideline 29 for information on exceptions to making baseline changes within the freeze period. (2)
General and Administrative (G&A)	Any management, financial, and other expense which is incurred by or allocated to a business unit and which is for the general management and administration of the business unit as a whole. G&A expense does not include those management expenses whose beneficial or causal relationship to cost objectives can be more directly measured by a base other than a cost input base representing the total activity of a business unit during a cost accounting period. (1)
Generally Accepted Accounting Principles (GAAP)	The standard framework of guidelines for financial accounting used in any given jurisdiction; generally known as accounting standards or standard accounting practice. (2)
Government Furnished Equipment (GFE)	A tangible item provided by the Government in a contract that is functionally complete for its intended purpose, durable, nonexpendable, and needed for the performance of a contract. Equipment is not intended for sale, and does not ordinarily lose its identity or become a component part of another article when put into use. Equipment does not include material, real property, special test equipment or special tooling. (adapted from FAR 45.101) Note: equipment can include assemblies, components, parts, and engineered items. (1)
Government Furnished Equipment (GFI)	Generic term for all Government information used by the contractor to perform work on the project. (Unique)
Government Furnished Material (GFM)	Material furnished by the Government consumed or expended in performance of a contract, component parts of a higher assembly, or items that lose their individual identity through incorporation into an end-item. Material does not include equipment, special tooling, special test equipment or real property. Property includes assemblies, components, parts, raw and processed materials, and small tools and supplies. (1)
High Dollar Value (material) (HDV)	Major components, assemblies, or critical piece-part items, etc. that are identified based on an analysis of material categories a company needs to procure and consume in the integration and build of an end item on a program. (2)
Horizontal Integration	The logical relationships and time-phasing between tasks and milestones from program start to finish. (2)
In Accordance With (IAW)	In agreement with something; in conformity with something. (idioms.thefreeDictionary.com) (3)
Interpretation Handbook (DOE EVMSIH)	This document as a whole. Defines the meaning of the EIA-748 guidelines within DOE. (unique)

Integrated Master Plan (IMP)	An event-based plan consisting of a hierarchy of program events with each event being supported by specific accomplishments, and each accomplishment associated with specific criteria to be satisfied for its completion. The IMP is normally part of the contract and thus contractually binding (DoD contracts). (DoD IMP/IMS Preparation and Use Guide, October 2005) (3)
Integrated Master Schedule (IMS)	An integrated and networked multi-layered schedule of program tasks required to complete the work effort captured in a related IMP. The IMS should include all IMP events and accomplishments and support each accomplishment closure criteria. (1)
Integrated Program Management Report (IPMR)	A contractually required report, prepared by the contractor, containing performance information derived from the internal Earned Value Management System. Provides status of contract cost and schedule performance). The IPMR is being phased in to replace the Contract Performance Reports (DI-MGMT-81466) and the Integrated Master Schedule (DI-MGMT- 81650). (2)
Integrated Product Team (IPT)	A cross-functional group of individuals organized for the specific purpose of delivering a project to an external or internal customer. It is led by a Federal Project Director. The IPT is accountable for planning, budgeting, procurement and life-cycle management of the investment to achieve its cost, schedule, and performance goals. Team skills include: budgetary, financial, capital planning, procurement, user, program, architecture, earned value management, security, and other staff as appropriate. (1)
Key Performance Parameters (KPP)	A vital characteristic, function, requirement or design basis that if changed, would have a major impact on the facility or system performance, scope, schedule, cost and/or risk, or the ability of an interfacing project to meet its mission requirements. A parameter may be a performance, design, or interface requirement. Appropriate parameters are those that express performance in terms of accuracy, capacity, throughput, quantity, processing rate, purity, reliability, sustainability, or others that define how well a system, facility or other project will perform. In aggregate, KPPs comprise the scope of the project. For a typical project, the expectation is for about 3-5 succinct and, measurable KPPs to be identified. (2)
Low Dollar Value (material) (LDV)	Material specifically designated as low risk. Typically many parts at low unit costs. The opposite of high dollar value material (HDV). (Unique)
Level of Effort (LOE)	Baseline scope of a general or supportive nature for which performance cannot be measured or is impracticable to measure using activity-based methods. Resource requirements are represented by a time-phased budget scheduled in accordance with the time the support will likely be needed. The value is earned by the passage of time and is equal to the budget scheduled in each time period. (1)
Lines of Inquiry (See Qualifying Expectation)	
Management & Operating Contract (M&O) Contractor	A Contracting Organization responsible for executing for a government site or grouping of facilities functions such as

	construction, repairs, physical plant operations, maintenance, equipment and systems stewardship, project and activity management, program and service personnel management, decommissioning, and waste management.
Material Requirements/Enterprise Resource Planning (M/ERP)	A method for the effective planning of all resources of a manufacturing contractor. It integrates planning of all aspects (not just production) of a manufacturing firm. It includes functions such as business planning, production planning and scheduling, capacity requirement planning, job costing, financial management and forecasting, order processing, shop floor control, time and attendance, performance measurement, and sales and operations planning. (2)
Material Management and Accounting System (MMAS)	A system used by a contractor for the planning, controlling, and accounting for the acquisition, disbursements, and disposition of material. They may be stand- alone systems or may integrate with planning, engineering, estimating, purchasing, inventory, accounting, or other systems. See Manufacturing/Enterprise Resource Planning System. (2)
Management Reserve (MR)	2. Management Reserve is an amount of the total contract budget withheld for management control purposes by the contractor for unexpected growth within the currently authorized work scope, rate changes, risk and opportunity handling, and other project unknowns. It is held outside the Performance Measurement Baseline but within the Contract Budget Base unless there is an OTB. (1)
Material Requirements Planning (MRP)	See Material Requirements/Enterprise Resource Planning (M/ERP) System. (2)
Near Critical Path	The lowest float or slack paths of discrete WPs and planning packages (or lower level activities) in the network that has the next longest total duration nearest to the critical path. (2)
Not to Exceed (NTE)	The portion of an estimated price for work scope the contractor is allowed to bill the government before reaching a final agreement on contract terms. Expenditures against this work scope are limited to this value. (2)
Organizational Breakdown Structure (OBS)	A tool that can be used by the project management team and/or project management team leader in a hierarchal manner for the purposes of conducting and creating a thorough and clearly delineated depiction of the project organization for the purposes of the identification of responsibility within the project. The CAM is typically the lowest level of the OBS. The OBS should be established at the onset of the project to help in the purposes of organization; however, it is possible to conduct this in an ongoing basis. (1)
Other Direct Costs (ODC)	An ODC is a cost that can be identified specifically with a final cost objective that the contractor does not treat as a direct material cost or a direct labor cost. There are several additional direct costs that can be proposed by the contractor. These additional costs include: <ul style="list-style-type: none"> • Special tooling, test equipment; • Computer services; • Consulting services; and

	<ul style="list-style-type: none"> • Travel. • Federal excise taxes; • Royalties; • Preservation, packaging, and packing costs; and • Preproduction costs. <p>(1)</p>
Overhead (OH)	<p>1. Indirect costs other than those related to general and administrative expense and selling expenses. (FAR 31.203(b))</p> <p>2. A general term often used to identify any indirect cost. (1)</p>
Over Target Baseline (OTB)	<p>A project management tool that may be implemented when the cost overrun to the CBB is formally incorporated into the PMB for management purposes. An OTB is implemented to regain an executable baseline for performance measurement; there is no change to the contract requirements or schedule. The CBB does not change when an OTB is implemented. An OTB allows project managers to retain visibility into the original CBB while measuring performance when a contract experiences an overrun. In an overrun condition, the revised TAB is equal to the sum of CBB and the recognized overrun. (Note: Contractor OTBs require DOE approval)</p> <p>(1)</p>
Over Target Schedule (OTS)	<p>A condition where the baseline schedule is time-phased beyond the contract's project completion date. While an OTS may be implemented without adding additional budget, normally an OTS also results in an OTB. (1)</p>
Program Evaluation and Analysis Technique (PERT-Cost)	<p>An earned value technique limited to LDV material. The formula is $Cum\ ACWP/EAC$. This technique is only valid if the EAC is current. [3 unique]</p>
Project Performance and Reporting System (PARS)	<p>A reporting process to connect field project status with headquarters to report and compare budgeted or scheduled project forecasts. (1)</p>
Project Performance and Reporting System Version E (PARSIIE)	<p>A reporting process to connect field project status with headquarters to report and compare budgeted or scheduled project forecasts. (DOE O 413.3B) (1)</p>
Project Execution Plan (PEP)	<p>DOE's core document for management of a project. It establishes the policies and procedures to be followed in order to manage and control project planning, initiation, definition, execution, and transition/closeout, and uses the outcomes and outputs from all project planning processes, integrating them into a formally approved document. A PEP includes an accurate reflection of how the project is to be accomplished, resource requirements, technical considerations, risk management, configuration management, and roles and responsibilities. (1)</p>
Project Manager (PM)	<p>The person assigned by the performing organization to achieve the project objectives. (1)</p>
Performance Measurement Baseline (PMB)	<p>A time-phased resourced plan against which the accomplishment of authorized work can be measured. (1)</p>
Performance Work Statement (PWS)	<p>Performance Work Statement - A statement of work for performance-based acquisitions that describes the required results in clear, specific and objective terms with measurable outcomes. http://www.acq.osd.mil/dpap/ccap/cc/jcchb/HTML/Topical/sow.html</p>

	(3)
Purchase Order (PO)	A commercial document and first official offer issued by a buyer to a seller, indicating types, quantities, and agreed prices for products or services. Acceptance of a purchase order by a seller forms a contract between the buyer and seller, so no contract exists until the purchase order is accepted. It is used to control the purchasing of products and services from external suppliers. (Wikipedia) (3)
Plan of the day (POD)	A term used in scheduling to indicate the portion of the IMS applicable for the current performance (unique)
Plan of the week (POW)	A term used in scheduling to indicate the portion of the IMS applicable for the current week's performance. (unique)
Period of Performance (POP)	The number of working days or calendar days, from a specified commencement date to a specified completion date, as provided for in a contract. (2)
Purchase Request (PR)	Related to PO, this is optionally an engineering request to purchasing regarding a material requirement. It typically has the estimate, need date, and delivery requirements. (unique)
P6	Abbreviation for Primavera software schedule tool. (unique)
Quantifiable Backup Data (QBD)	This is also sometimes referred to as "Predetermined Rationale", and essentially requires the establishment of lower level milestones, activities, or steps to determine the percent complete. These steps are established and weighted prior to beginning the effort. (H&A website) (3)
Qualifying Expectations (QE)	Formally known as qualifying expectations lines of inquiry (QE LOI). In this document they define the minimum expectations to meet the requirement of the EIA-748 guideline. All corrective action requests (CARs) will be referenced against an individual LOI. (Unique)
Responsibility Assignment Matrix (RAM)	A chart showing the relationship between the Contract Work Breakdown Structure elements and the organizations assigned responsibility for ensuring their accomplishment. The RAM depicts the assignment of each control account to a single manager. When resource values are applied to these relationships, it may be referred to as a dollarized RAM. (2)
System Description (SD)	The EVM System Description is either a stand-alone document or in a set or series of integrated process descriptions/procedures that describe the contractor's approach to a compliant EVMS. (3)
Schedule Margin (SM)	A management method for accommodating schedule contingencies. It is a designated buffer within the schedule and does not have assigned resources. (2)
Subcontract Data Requirements List (SDRLS)	Same as CDRL except between prime and subcontractor. (unique)
Start-Finish (SF)	Task 1 must start before task 2 can finish. This schedule relationship is illogical and not recommended. (unique)
Summary Level Planning Package (SLPP)	An aggregation of work for far-term efforts which can be assigned to reporting level WBS elements but not to the control account level and are therefore not "undistributed budget". (1)
Statement of Work (SOW)	A narrative description of contracted products or services. (1)

Start-Start (SS)	Logical relationship between two project activities in which the initiation of work for a successor activity is dependent on the initiation of the work for a predecessor activity. (1)
Schedule Visibility Task (SVT)	Tasks, activities or milestones in the Integrated Master Schedule (IMS) that increase management visibility and functionality of the schedule for non- Performance Measurement Baseline related items. SVTs are included in the IMS to characterize potential impacts to the logic-driven network. (2)
Total Allocated Budget (TAB)	The sum of all budgets allocated to the contract for the project. The TAB is equal to the Contract Budget Base (Performance Measurement Baseline plus Management Reserve) unless an over target baseline (OTB) has been implemented. After an OTB, the revised $TAB = CBB + overrun$. See Figures 3-4A–4E and 3-14. (APM) (2)

Total Project Costs (TPC)	All costs between CD-0 and CD-4 specific to a project incurred through the startup of a facility, but prior to the operation of the facility. Applicable costs to achieve CD-0 may also be included. Thus, TPC includes the total estimated cost and fee for all contracts included in the project and may include Government prime contracts for external independent review, technical support services, and other prime Government contracts for components of the projects. TPC is the summation of TEC plus OPC, as well as the summation of the PMB + MR + contingency + profit/fee + other DOE costs. (1)
Undistributed Budget (UB)	A temporary holding account for authorized scope of work and its budget that has not been assigned to a control account or summary level planning package. This is a part of the PMB and is contractor controlled. (1)
Variance Analysis Reports (VAR)	A Variance Analysis Report (VAR) that includes specific information about the cause, impact, and corrective action “provides management with early insight into the extent of problems and allows corrective actions to be implemented in time to affect the future course of the program” (H&A Website) (3)
Variance at Complete (VAC)	The difference between the budget at completion and the estimate at completion is $VAC = BAC - EAC$. (Source: DOE Guide 413.3-10A DOE EVM Gold Card). It may be calculated at any level from the control account up to the total contract. It represents the amount of expected overrun (negative VAC) or underrun (positive VAC).(1)
Vertical Integration	Demonstrates the consistency of data between the various levels of schedules and consistency of data between various Work Breakdown Structure elements and/or Integrated Master Plan/Integrated Master Schedule elements (if applicable) within the schedules. (2)
Work Authorization Document (WAD)	A contractor’s internal process for authorizing the commencement of program work. All work within a program is described in terms of work scope, budget and schedule and authorized through the work

	authorization system. (2)
Work Breakdown Structure (WBS)	Used by the project management team to organize and define a project into manageable objectives and create a blueprint by which the steps leading to the completion of a project are obtained. It is a product-oriented family tree composed of hardware, software, services, data and facilities and other project-unique tasks which serves as an outline of the project that becomes more detailed under the subheadings or WPs (1)
Work Breakdown Structure Dictionary (WBSD)	A two-part document containing: 1) a listing of all WBS elements, and 2) the defined scope of each element. Work that is included, as well as closely related work that is excluded is normally contained in the definition of each WBS element. With EVM the Dictionary may be extended to the Control Account Level or one level above. (1)
WP (WP)	A WP contains a task or set of tasks performed within a control account, and is the point at which work is planned, progress is measured, and earned value is computed. (1)
Sources	1) DOE APM Glossary of Terms Handbook 9/5/2014 2) DOD EVMS Interpretation Guide 2/18/15 3) Others as specified

APPENDIX C – REFERENCES

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Federal Acquisition Regulation (FAR) Subpart 34.2, and Part 52. [http://farsite.hill.af.mil/Integrated Master Plan and Integrated Master Schedule Preparation and Use Guide, DoD, October 21, 2005](http://farsite.hill.af.mil/Integrated%20Master%20Plan%20and%20Integrated%20Master%20Schedule%20Preparation%20and%20Use%20Guide%20DoD%20October%2021%2C%202005). http://www.acq.osd.mil/se/docs/IMP_IMS_Guide_v9.pdf

OMB Circular A-11, Part 7, *Capital Programming Guide*
http://www.whitehouse.gov/omb/circulars_a11_current_year_a11_toc

APPENDIX D – PRODUCTION AND MANUFACTURING UNIQUE ASPECTS

Of Earned Value Implementation

In limited circumstances, EVMS requirements may be applicable to production type projects. The purpose of this appendix is to explain the unique aspects as it related to earned value. The discussion will be referenced back to QE LOIs and is presented here so that the total tailoring can be discussed.

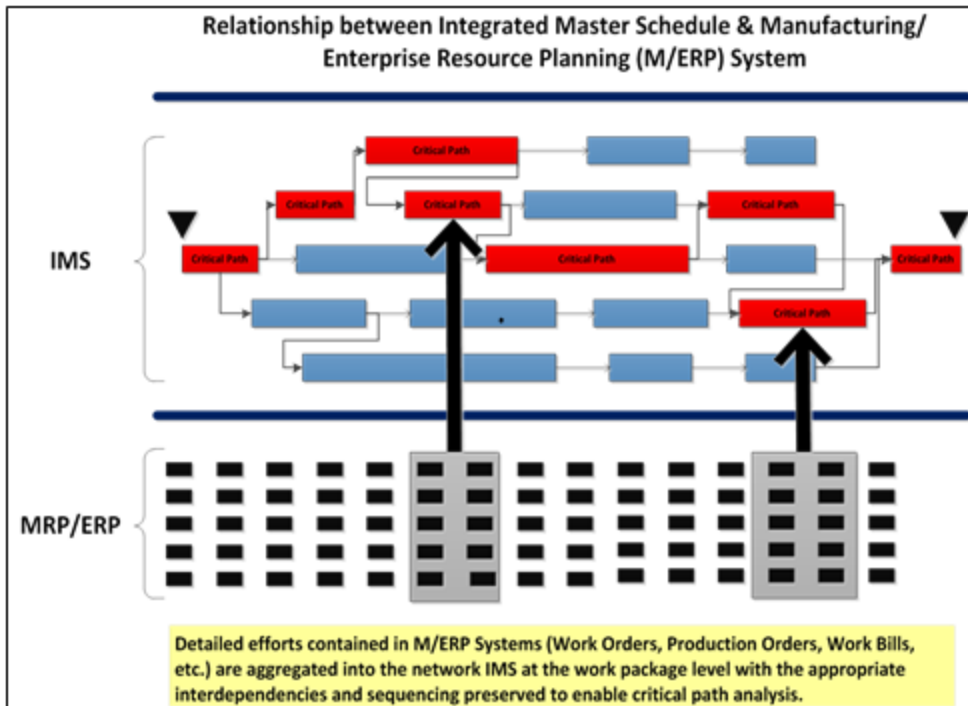
Production or manufacture projects are characterized by multiple similar products produced over time. Typically because of complex just in time management aspects, they may be managed with a more formal Material Requirements/Manufacturing/Enterprise Resource Planning (M/ERP) system. Questions typically in this environment are:

1. What are the expectations for integration?
2. What are the expectations for scheduling?
3. What are the expectations for unit costs?
4. What are the expectations for material management?

The term M/ERP is used to indicate a tool typically used to monitor resources, material, and product flow through the factory. The unique aspects focus on the integration between the M/ERP system and the primary EVM artifacts that are expected.

Guideline 3 QE LOI 3.A.1 requires that a common coding structure be developed to integrate the subsystems. The QE LOI discusses the WBS and OBS. However, there may be other codes in the M/ERP that map directly to the project WBS. Typically M/ERP do not plan work by WBS, rather by lots through the factory production. However it still must be directly integrated.

Guideline 6 QE LOIs 6.A.1 and 6.A.3 require in part that the IMS contains all of the discrete work. There is no requirement that the project IMS reflects all of the detail in the M/ERP system. Rather the M/ERP system is used for detail status, and the interface with the IMS is at the work package level. The IMS work package level must be statused consistently with the M/ERP forecasts. See the figure below for an example.



Guideline 10 QE LOI 10.A.1 requires budgets for material, to include high value production and/or critical material, are planned discretely using objective milestones or other rational basis for measuring the amount of material consumed.

Guideline 20 QE LOI 20.A.1. The primary application of unit costs is in a production environment. The unit cost is also known as the standard cost. Typically this is the bases for the budget and then performance is measured against this. See Guideline 21 for more discussion of this requirement.

Guideline 21 All QE LOIs. In general, budgets for all material, to include critical or high value production material, should be planned discretely using objective milestones or other rational basis for measuring the amount of material consumed. Once production material is categorized as high dollar value, then the same planning, budgeting, and statusing requirements discussed in Guideline 21 apply.

Additionally production material may have other unique aspects. For contractors implementing modernized and automated material control systems in production environments which include Grouping, Pegging and Distribution (GPD) concepts and capabilities, careful consideration must be addressed regarding the following:

- Material classes and categories between the EVMS (as described) and the material control system must be defined and mapped with the product-oriented WBS and charge numbers (network demand).
- The WBS should be aligned in a product-oriented manner with the material control system products rather than a functional approach to ensure the material work scope and budget relationship is established for accurate comparison to direct costs.
- Breakpoints in groupings and grouping definitions are aligned with how the planned material item(s) use/consumption is related to the modeled schedule need dates and associated material budgets.

- Breakpoints are defined and establish cost collection points in the priced and indented parts list.
- The planned consumption of material models how the charge numbers (network demand) are assigned to the WBS in advance of work commencement.
- Controls are defined and established relative to retroactive changes as a result of GPD parts re-prioritization, re-routing, movement of direct costs. (See Guideline 30.)