



Operating Fermi National Accelerator Laboratory
for the U.S. Department of Energy

Earned Value Management (EVM) System Description

3/12/2019

Version 8.2

Contact Information

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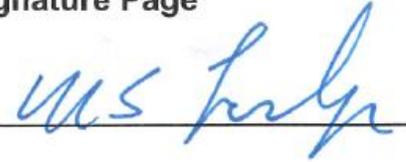
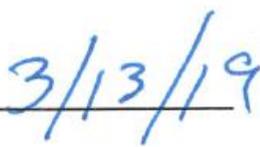
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The FRA Earned Value Management System Description is presented in two parts. Part 1, which forms the main part of this document, is the Systems Description that provides an overview of the EVMS, establishes requirements for its use, defines system components, and describes the interface between these components. Part 2 contains the guidelines and links to procedures for implementing and performing the EVMS component processes described in Part 1.

Appendix A includes a table documenting where each of the thirty-two Earned Value criteria contained in the Electronic Industries Alliance (EIA)-748 EVMS standard is addressed in this manual.

Signature Page

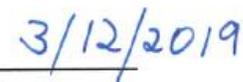
 

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Change Log

Revision Number	Revision Date	Impacted Sections	Change Description
0	07/28/06	All	Unapproved
1	10/17/08	All	Revised in conjunction with writing procedures and certification review.
2	12/2/08	All	Removed references to funding, added accounting procedure references, changed the wording in 4 removed two Performance Measurement Techniques, and revised the title of Procedure 12.PM-003
3	3/27/09	All	Removed "Fermilab" terminology, revised phraseology consistent with "contingency/management reserve", revised "cost account" to chargeable task code, other minor rewording.
4	9/17/09	All	Included provision for performance management on collaborator un-costed labor; revised definitions for contingency and management reserve; included provision for undistributed budget
5	1/12/10	3.6.2, 5.1.2.1, 5.2.1, 9	Revised Undistributed Budget definition. Revised management reserve/contingency terms
6	8/19/13	Contact Info, Signature page	Updated EVMS owner, Update OMPO to OPSS, Update Director

Revision Number	Revision Date	Impacted Sections	Change Description
		<p>3.6.1, All</p> <p>4</p> <p>5.2.6</p> <p>5.3.2</p> <p>5.3.1,</p> <p>6.2.2</p> <p>All</p>	<p>Revised management reserve/contingency section.</p> <p>Revised language in the version of Disclosure Statement from a specific dated version of the latest version.</p> <p>Added detail on ETC methodology.</p> <p>Added timeline information to monthly reporting cycle section in response to 2011 surveillance.</p> <p>Added section on the calendar for monthly reporting cycle.</p> <p>Updated to include organizational changes in change control process.</p> <p>Updated references to DOE O 413.3A to DOE O 413.3B and removed references to outdated DOE M 413.3-1 and DOE 430.1-1.</p> <p>Updated language related to Management Reserve.</p>
7	11/6/14	<p>Subcontracts without Flow-Down</p> <p>5.1.2.2</p>	<p>Removed sentence <i>"If collaborator work includes un-costed labor, then monthly reporting of hours expended will be required in order to perform earned value</i></p>

Revision Number	Revision Date	Impacted Sections	Change Description
		3.5.2	<p><i>analysis.</i>"</p> <p>Changed sentence <i>"For projects where un-costed labor is utilized, actual hours of effort for those resources may be collected."</i></p> <p>Removed incorrect reference to Contract Budget Base</p>
8	11/19/14	<p>All</p> <p>2</p> <p>4, 5, 5.1.2.1</p> <p>5.2.6</p>	<p>Standardized Document Format.</p> <p>Standardized change requests to baseline change request or BCR for consistency.</p> <p>Clarified Project Manager's reporting hierarchy.</p> <p>Removed <i>Un-costed Labor</i> statement.</p> <p>Updated EAC statement to read <i>"EACs should never be formulaic."</i></p>
8.1	6/20/16	<p>All</p> <p>3.4, 5.1.1, & 5.1.2</p> <p>3.5</p> <p>3.5.3</p> <p>3.8</p>	<p>Removed hyperlinks and corrected format issues.</p> <p>Moved Scheduling process details to 12.PM-004.</p> <p>Moved Estimating process details to 12.PM-005.</p> <p>Replaced reference to "Project's Change Management requirements" to Change Control Procedure</p> <p>Added Statement of Work as another</p>

Revision Number	Revision Date	Impacted Sections	Change Description
		5.2.3 All, 5.1.2, & 5.3	document for collaborative efforts Corrected discrepancies with Figure 1: Earned Value Data Elements Corrected issues Identified during EVMS annual Surveillance per CAP. Specifically: All – removal of external Hyperlinks 5.1.2 – Clarified language regarding mixing of LOE and discrete work. 5.3 – Removal of requirement for inclusion of reporting calendar in PMP
8.2	3/12/2019	All 4.4 6.	Corrected Minor spelling and Grammatical errors. Also updated references to 748 EVMS removing Standard by American National Standards Institute (ANSI) and changing revision from B to C. Removed capitalization threshold of \$50,000 by referencing Standard Disclosure Statement and financial procedures Change Control: Added Change Request and Change Request timing sections per standardized practices of Office of Science EVMS handbook. Also, clarified change control categories per OS EVMSHB.

Revision Number	Revision Date	Impacted Sections	Change Description
		<p>1.2</p> <p>3.4</p> <p>2.4</p>	<p>Provided clarity on when EVMS baseline needs to be established, i.e., no later than required to have four months of stable data prior to baseline IPR, Added Maximum allowable period of Performance requirements per Office of Science EVMS handbook.</p> <p>Clarified when Variance thresholds need to be addressed in PMP.</p> <p>Clarified when to re-sign the PEP after authorized changes are made.</p>

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PART 1: SYSTEM DESCRIPTION

1. INTRODUCTION

Fermi Research Alliance, LLC (FRA) is a Universities Research Association (URA) and University of Chicago (UChicago) Limited Liability Corporation, created specifically to manage and operate Fermi National Accelerator Laboratory (Fermilab) for the Department of Energy (DOE). This FRA Earned Value Management System description provides the requirements, procedures, authorities, and responsibilities for implementing an Earned Value Management System (EVMS) on projects subject to the U.S. Department of Energy: DOE Order 413.3B Program and Project Management for the Acquisition of Capital Assets. This system description also applies to large and/or high-risk projects that have been determined by management to require EVMS project management controls. The assigned Project Manager has the primary responsibility for implementing the EVMS and for ensuring projects are planned and executed consistent with the requirements and processes defined in this system description. The Office of Project Support Services (OPSS) has the primary responsibility for maintaining the EVMS and maintaining interfaces with existing Fermilab business and management systems.

1.1 CORPORATE POLICY STATEMENTS AND EVMS PRINCIPLES

Fermi National Accelerator Laboratory is a Department of Energy National Laboratory operated under a contract with DOE by Fermi Research Alliance, LLC. Fermilab's mission is to advance the understanding of the fundamental nature of matter and energy by providing leadership and resources for qualified researchers to conduct basic research at the frontiers of high-energy physics and related disciplines.

As a DOE Laboratory, projects performed at Fermilab adhere to the requirements in DOE Order 413.3B Program and Project Management for the Acquisition of Capital Assets. For the purposes of this document, we will refer to these projects as "major projects" or "the project." Additionally, DOE Order 413.3B specifies that the EVMS must comply with the industry standard for project control systems described in EIA-748-C, Earned Value Management Systems.

This Earned Value Management System Description documents the project management processes essential to effective planning, organization, control, and surveillance of major projects. It is written to comply with the following standards:

- EIA-748-C, Earned Value Management Systems, the Industry standard for implementing EVMS
- DOE Order 413.3B Program and Project Management for the Acquisition of Capital Assets

The seven principles of an EVMS as defined by the EIA standard are as follows:

- Plan all work scope for the project to completion.
- Break down the project work scope into finite pieces that can be assigned to a responsible person or organization for control of the technical, schedule, and cost objectives.
- Integrate the project work scope, schedule, and cost objectives into a Performance Measurement Baseline (PMB) against which accomplishments may be measured. Then Control changes to the PMB.
- Use actual costs incurred and recorded in accomplishing the work performed.
- Objectively assess accomplishments at the work performance level.
- Analyze significant variances from the plans, forecast impacts, and prepare an estimate at completion based on performance to date and work to be performed.

- Use EVMS information in management processes.

The basic tenet of the EVMS process is structured around the five EIA guideline categories, which are as follows: (1) Organization, (2) Planning, Scheduling, and Budgeting (3) Accounting Considerations, (4) Analysis and Management Reports, and (5) Revisions and Data Maintenance.

1.2 PURPOSE AND OBJECTIVES

The system description presents policies and procedures that define the FRA approach to an Earned Value Management System. The objective is to provide Project Managers with tools that facilitate optimal planning, accurate reporting, and effective control through the standardization of processes used for project scope, schedule, and budget management. The EIA principles are integrated and organized by the guidelines into a comprehensive system that develops and maintains the baseline; tracks project cost, schedule, and scope, and provides for the generation of timely performance measurement data and reports. Performance measurement reports provide management with objective project information critical to monitoring progress, identifying significant issues, and implementing corrective actions as needed.

Compliance with the EVMS Description policies and processes described in the implementing procedures are required for all activities performed within the project approved Performance Measurement Baseline (PMB).

Because project planning and development is an iterative process, DOE major projects take a graded approach to the FRA EVM System Description prior to establishing the PMB. However, projects must demonstrate they are capable of EVMS compliance before a baseline Independent Project Review (IPR). To demonstrate compliance, the project must establish formal baseline practices including establishment of baseline, monthly status, monthly EVMS reporting, and change control early enough to produce four months of meaningful EVMS performance data.

1.3 TAILORING THE EVMS PROCESS

The application of EVMS requirements can be tailored among project elements depending on customer requirements and project risk. A fundamental premise of the process is that all projects can be managed through the application of a graded approach to project management and controls. Thus, elements are assessed, and a graded approach is applied to the application of the project management requirements, which verifies that adequate, but not excessive, controls are applied. Additional control processes for the project may be implemented when required by the customer or sponsor. OPSS has the ultimate responsibility to ensure that tailoring of any EVMS process does not violate the intent of EIA-748-C and the FRA certified EVMS. Verification of EVMS compliance is confirmed during the individual project EVMS surveillance process, overseen by OPSS.

All applicable projects will consistently follow the process outlined in this document. Although tailoring to a project's specific needs is appropriate and expected, an EVMS must be applied in a consistent and formally documented process commensurate with the project's budget, scope, and risk. Implementing, monitoring, controlling, and self-auditing the process assures the highest level of project performance.

Tailoring of any requirement or process is only permitted as described in this Earned Value Management System Description document or associated implementing procedures and must be documented in the project's Federal Project Execution Plan (PEP) or Fermilab-prepared Project Management Plan (PMP). Customization of reporting or approval thresholds different from those established in this manual must also be documented in these project-specific management plans cited above.

2. ORGANIZATION

Project organization is one of the most important functions of project management. It ensures that work is adequately defined, identifies organizations responsible for performing the work, and assigns responsibilities for managing and performing the work to the appropriate internal or external organization.

An initial level of project organization must be established early in a project's life cycle. At a minimum, the Project Manager (PM) and the customer or the DOE Federal Project Director are selected along with a core team to begin project planning and defining customer requirements, including what constitutes project completion. The PM and the first members of the Integrated Project Team (IPT) are selected during the justification of Mission Need and Initial Planning phase. The IPT is led by the customer's project director, which on DOE projects is known as the Federal Project Director.

The PM typically reports to a Division Head. The organizational structure is described in the PEP. The PM has the authority and the responsibility to execute the project within the scope, budget, and schedule agreed to with the customer. The PM delegates the same responsibility to the Control Account Managers (CAM) for the Control Accounts (CA) assigned to them.

During the project initiation phase, prior to CD-0 on DOE projects, the team begins the development of an initial Work Breakdown Structure (WBS) and an initial approximation of the project's budget and schedule. At this stage of the project, summary level planning (i.e., design, construction, etc.) is being developed in a conceptual sense.

PMs need to continue to assess the organization of the project throughout the project's lifecycle. This includes refining the structure of the WBS and ensuring staff is properly trained to fulfill their assigned roles and responsibilities. Planning the work scope for the project from initiation to completion is essential to control "scope creep." All stakeholders must accept the project scope early in the planning process and prior to Final Design. Once the Performance Measurement Baseline (PMB) is determined, a final Project Execution Plan is issued, outlining the scope, budget, and schedule for the project, which is then reviewed and updated at all major phases of the project. The IPT charter and membership can change as the project evolves throughout the execution phase.

Project WBS, OBS, and RAM (EVMS Procedure 12.PM-001) describe the formal process of organizing and structuring project work scope. The WBS provides the framework for cost estimating, scheduling, budgeting, authorizing, tracking, costing and reporting of project work. The procedure includes guidelines and instructions for the development of the Work Breakdown Structure, the Work Breakdown Structure Dictionary, the Organizational Breakdown Structure, and the Responsibility Assignment Matrix.

2.1 WORK BREAKDOWN STRUCTURE (WBS)

The Work Breakdown Structure (WBS) is a product-oriented, hierarchical depiction of all work elements required to accomplish the entire work scope of the project. Each descending level is a subdivision of the work above, with increasingly detailed definition/division of the work. The WBS is the structure for integrating the scope, schedule, and budget for all project work. It is used as a framework for assigning and defining work, developing schedules, estimating and budgeting, managing funds, and controlling changes. The WBS is used by management throughout the lifecycle of a project to identify, assign, and track the project's total work scope. Each element is assigned a unique code to identify it in all project documents. The WBS is detailed in the PEP or attached as an appendix. An example of a WBS is in Project WBS, OBS, and RAM (EVMS Procedure 12.PM-001).

2.2 WBS DICTIONARY

All projects operating under EVMS are required to develop a WBS Dictionary. The WBS Dictionary is a set of specific definitions that describe how work is carried out to develop, design, construct, equip, and manage the project. It defines each element to at least the CA level in terms of the content of the work to be performed. An example of a WBS Dictionary format is found in Project WBS, OBS, and RAM (EVMS Procedure 12.PM-001). The WBS Dictionary serves as the scoping document supporting the work authorization process.

2.3 ORGANIZATIONAL RESPONSIBILITY

2.3.1 Organizational Breakdown Structure

The Organizational Breakdown Structure (OBS) is a project organization framework for identification of accountability, responsibility, management, and approvals of all authorized work scope. It is a direct representation and description of the hierarchy and organizations that will provide resources to plan and perform work identified in the WBS. The OBS helps management focus on establishing the most efficient organization, by taking into consideration the availability and capability of management and technical staff, including subcontractors, to achieve project objectives. The OBS for each project is found in the PEP. An example of an OBS is in Project WBS, OBS, and RAM (EVMS Procedure 12.PM-001).

Throughout the WBS, all project work scope is defined to a level where unique organizational and personal responsibilities are established. The individual assigned responsibility for accomplishing work at the (CA) level is designated as the CAM. CAs are divided into smaller, discrete scopes of work called work packages, and a Work Package Manager can be assigned to each work package.

2.3.2 Control Account (CA)

A CA is a management control point at which budgets (resource plans) and actual costs are accumulated and compared to an objective measurement of work performed for management control purposes. The CA is the minimum level in the WBS structure where project cost and schedule performance is compared. A CA is a natural management point for planning and control since it represents the work assigned to one responsible organizational element for one WBS element and is the point at which the WBS and OBS intersect. The CAs are determined by the scope of the management tasks. A single CAM is assigned to one or more of these CAs and is responsible for the planning and control within their CA(s) and the identification, analysis, and reporting of significant variances that may occur during project execution.

2.3.3 Work Packages

Work packages (WP) are a subdivision of a CA and consist of a discrete or level of effort task that has been planned and budgeted in detail. The budget for each is segregated into elements of cost (resources). WPs constitute the basic building blocks used in planning, measuring accomplishment, and controlling project work. Each WP must have a minimum of at least one scheduled activity. Work package characteristics are detailed in Control Accounts, Work Packages, Planning Packages (EVMS 12.PM-002).

2.3.4 Planning Packages

Planning Packages (PP) are created to describe work within a CA that will occur in the future. PPs must have a work scope, schedule, and time-phased budget. PPs are normally larger (scope, schedule, and budget) than individual detailed work packages, but PPs must still relate to a specific work scope. Individual PPs do not require the detail of WPs in the schedule. When PPs are converted into WPs, they are defined in greater detail. See also the procedure Control Accounts, Work Packages, Planning

Packages (EVMS 12.PM-002).

2.4 PROJECT EXECUTION PLAN

A Project Execution Plan (PEP) must be developed for each project and is the primary vehicle that correlates project objectives with a plan for accomplishment. It also serves as the agreement between the customer, senior management, and the project's management on how the project will proceed.

The PEP summarizes the mission need and justification for the project, describes the responsibilities of the organizations involved in the project, provides a general overview of the project, and outlines cost and schedule data. In addition to summarizing all management structures, the resource plan, and the environmental, safety, and health (ES&H) requirements, the PEP establishes the customer change control thresholds and the technical, cost, and schedule baselines. The major elements required in a DOE project's Project Execution Plan are stated in DOE Order 413.3B.

On DOE projects, the Federal Project Director develops the PEP with input from the project management team (the Project Director/Manager, Deputy Director/Manager, etc.). This team will be referred to in this document as "project management." After obtaining concurrence from the Fermilab Site Office (FSO), the PEP is formally approved by DOE headquarters. For all projects, the Project Execution Plan is placed under configuration control. However, re-signing of agreed changes to the PEP is at the discretion of the DOE headquarters and if the PEP is not re-signed then appropriate documentation validating the change authorization will be documented.

In addition to the PEP, FRA projects will also develop a Project Management Plan (PMP), authored by the Project Manager and approved by OPSS. This plan describes how project specific EVMS practices such as VAR thresholds (if different than FRA EVM SD standard) and areas such as risk, quality, resources, interfaces, and configuration control will be managed.

2.5 RESPONSIBILITY ASSIGNMENT MATRIX

The Responsibility Assignment Matrix (RAM) is an element of the project plan that integrates the WBS with the OBS. This integration identifies key control points at the intersections of the WBS and OBS. CAs are created at these key control points, facilitating the linkage between planning, scheduling, budgeting, work authorization, cost accumulation, and performance measurement processes. Using the RAM, responsible and accountable CAMs are identified for every CA in the Project's WBS. Higher levels of responsibility, such as PM and Level 2 Managers are identified using the OBS. An example of a RAM is in Project WBS, OBS, and RAM (EVMS Procedure 12.PM-001).

2.6 TRAINING

All personnel involved in planning or implementing the EVMS process, including existing staff and on-site contractor personnel, new hires, and transfers, are trained at the level applicable to their roles and responsibilities. At a minimum, EVMS training requires that PMs and CAMs read the current version of this Earned Value Management System Description document and complete EVMS training when first associated with a project. These individuals may also be required to read additional EVMS reference materials or addendums as identified by specific project requirements. Refresher training for those involved in active projects is required on an annual basis.

Training is delivered through on-site or web-based training sessions and may be customized to meet project specific requirements. Formal training is given at various levels of rigor, thus allowing training modules to be tailored specifically for each role. For example, accountable Program Managers and division/center/section heads need only to receive an overview of the EVMS processes, while PMs,

project controls staff, and CAMs receive a more systematic and thorough presentation of roles, responsibilities, and techniques as outlined in this System Description and the implementing procedures.

3. PLANNING, SCHEDULING, AND BUDGETING

This chapter discusses how the project planning outputs discussed in Chapter 2 (WBS, OBS, PEP, and RAM) are used to develop the project schedule, from preliminary schedules to the definitive detailed project schedule. Project planning, scheduling, and budgeting involve organizing and documenting the approach and effort required to complete the approved scope of work based on dependencies, interfaces, constraints, and other factors. These are organized into a time-phased sequence that fits within the boundaries established by the customer's schedule and budget objectives. A schedule and cost range is developed from the preliminary WBS. As the WBS becomes more refined, through design criteria developed in the conceptual phase of the project, the project schedule is also refined.

PMs must balance customer requirements with the customer budget for their projects and must ensure this is reflected in their schedules. Budgeting begins with a rough order-of-magnitude cost range. As estimates are refined, contingency budgets are established. Work authorizations are prepared for both external and internal participants throughout the life cycle of the project. Preliminary planning information evolves into the fully-integrated, resource-loaded Performance Measurement Baseline (PMB), which supports establishing the project baseline at Critical Decision (CD)-2. Through final design, construction, and closeout, the PMB and contingencies/management reserves are maintained, updated, and logged to track the project's performance and status accurately.

3.1 BASELINE DEVELOPMENT PROCESS

Baseline development or baseline planning can be defined as making decisions today with a view of the future. Planning considers the "who," "what," "why," "when," and "where" for current effort while anticipating various needs and interactions of future effort. This future-oriented process involves setting objectives, gathering and organizing information, determining feasible courses of action, selecting and implementing courses of action, and monitoring the results to ensure accomplishment of the objective. Planning is often performed in the absence of perfect information; however, decisions and assumptions do need to be made. Although planning is rarely perfect, good planning involves making and documenting assumptions using the best information available.

The planning process consists of the following steps:

- Establish a set of goals that are required to achieve the desired result (on DOE projects, the desired result is defined in the Mission Need Statement at CD-0)
- Assess project risk and develop actions to minimize risk events.
- Formulate the plans for completing the work.
- Implement the plans (e.g., do the work).

A product of the planning process is the development of a Performance Measurement Baseline (PMB), which is used to measure and control project work activities throughout the project lifecycle. The project PMB consists of three components:

- The technical component of the baseline describes the work scope and technical specifications that the project must meet.
- The schedule component is the time-phased, logical relationship of interdependent activities required to complete the project.

- The budget component is a time-phased, planned, and approved budget to complete the project's work scope based on the project's baseline schedule.

Each of these baseline components evolves and changes through the refinement of the project's technical objectives and during major project design and construction phases. All changes to the PMB are documented through the project change control process (See **CHANGE CONTROL**).

3.2 RISK MANAGEMENT

Effective risk management is an essential element of every project. The risk management process is based on the principles that risk management must be analytical, forward-looking, structured, informative, continuous, and dynamic. Risk management is initiated and fully integrated with the baseline planning process. As work scope is defined and scheduled, individuals responsible for planning and performing the work apply core elements of risk management. The activities and their logic-driven interdependencies are evaluated for possible risks that could preclude successful completion within established technical, schedule, and budget constraints.

The risk management process is comprised of four key areas – (1) Planning, (2) Assessment (including risk identification and analysis), (3) Handling, also referred to as risk mitigation, and (4) Monitoring/Improving. The overriding objective of the process is to identify potential project risks, incorporate risk management strategies into the plan, and implement actions that mitigate their impact.

Risk assessments are performed as early as possible in a project's lifecycle and identify critical technical, performance, schedule, and budget risks. Once risks are identified, appropriate risk mitigation strategies and actions are developed and documented. Contingency is developed during project planning based on risk assessment and mitigation strategies. The risk mitigation strategy for all projects utilizing an EVMS includes the establishment of adequate contingency budget and a schedule contingency to reasonably ensure successful project completion.

As the project progresses, new information and insights allow the Project Manager to refine the identified risks and mitigation strategies or remove the risk from consideration once it is no longer applicable. This is accomplished through regular (normally monthly or as specified in the project's PMP or the Risk Management Plan) review of project risks by CAMs as they analyze cost and schedule variances, develop corrective actions, and execute the corrective actions to completion. In addition, risks are considered during the development of Estimates to Complete (ETC) by the CAM.

A risk management plan and a risk assessment are required for DOE projects per DOE Order 413.3B. The risk management process and results from the risk assessment can either be included as part of the Project Execution Plan or as a standalone document depending on the significance of project risks.

3.3 TECHNICAL BASELINE

The technical element of the PMB contains work scope definition, technical specifications, objectives, and assumptions. It structures the project's technical work to verify the required objectives are defined and establishes a framework to identify and organize all elements of work into the project WBS. The technical element of the project baseline continues to evolve throughout the design phases of the project. **Table 1: Technical Baseline** shows the technical baseline evolution process and Critical Decision stage planned for a typical project.

Table 1: Technical Baseline

Basis Document By Project Phase	DOE Critical Decision
Mission Need Approval Document	CD-0
Conceptual Design Report	CD-1
Technical Design Report	CD-2
Final Design Report	CD-3

The technical objectives for projects are implemented using the process described in the Fermilab Engineering Manual (FEM). Design reviews are conducted to verify the design meets the technical and functional requirements. A configuration management process is applied throughout the project lifecycle. Design changes are documented and formally approved in accordance with their impact on the project and integrated with the change control processes as described in Change Control (EVMS Procedure 12.PM-007).

Technical performance is measured against controlled technical performance indicators, quantitative and qualitative, throughout the project execution phase. The technical element of the baseline is integrated with the schedule and budget components of the baseline to monitor technical performance in relation to schedule and cost performance.

3.4 PLANNING AND BASELINE SCHEDULING

The development of the Project Schedule is the responsibility of the entire project team and may involve multiple iterations in order to reach a workable plan for accomplishing the work scope. The CAMs are responsible for the content and accuracy of their respective schedules. The project schedule is structured and numbered consistently with the project WBS.

The project schedule is used to plan and control the interdependencies of all the activities and resources needed to execute the project. Schedules address both how and when the work is to be performed by identifying all activities necessary to accomplish the project scope and time phasing these activities using durations and schedule logic. Each activity's duration is determined by understanding the effort involved in performing the activity as well as the resources needed to accomplish it. These resources can be both labor and material.

The time phasing of the scheduled activities, combined with applying labor and material (M&S) resource requirements to each task, results in the development of a profile of budget needs for the life cycle of the project. Contingency needs are then added to this time-phased budget to produce a fiscal year profile for the budget needs of the project. Care must be taken to ensure the project's budget profile falls within the annual and total funding profile provided by the customer.

Milestones will be included at various levels in the schedule to reflect the start or completion of significant events. They are linked to their associated tasks with logic ties such that when the scope of that activity is accomplished, the milestone will reflect that accomplishment. These milestones will be coded to reflect their level of significance. Significant milestones will be listed in the PEP.

Finally, as the schedule matures, and the projects move to establish a baseline as addressed in section 1.2, the project Resource Loaded Schedule (RLS) must adhere to EIA 748-C guidelines. EIA 748-C guidelines limit discrete activities to a "short span of time." Activities exceeding the defined "short span of time" must utilize Quantifiable Backup Documentation (QBD) to earn value. The FRA definition of a "short span of time" is three months average or less based on the working calendar expressed in days.

The average number of working days in a three-month calendar is determined using the formula $D_R = W/D * D_Y / M_Y * 3$ (D_R is days rounded to nearest whole number, W is working calendar days, D is days in a week, D_Y is days in a year i.e. 365.25, and M_Y is months in a year i.e. 12). For example, on a five day calendar the number of days in a three-month period is 65. Also, this same guidance applies to discrete activities that are started but not finished.

Project Scheduling (EVMS Procedure 12.PM-004) describes the formal process for implementing the planning and scheduling requirements defined in this EVMS description. The procedure defines the scheduling system structure and the requirements and responsibilities for projects subject to DOE Order 413.3B and on projects where an EVMS is deemed appropriate.

3.5 COST ESTIMATING AND BASELINE BUDGETING

Cost estimates are prepared in a clear, consistent, and comprehensive format that facilitates review of details and assumptions throughout the cost estimate review process. Activities to be estimated are identified in enough detail to support the cost estimate methodology used. Cost estimating is the fundamental process used to create the budget element of the project baseline.

Cost Estimating (EVMS Procedure 12.PM-005) describes the process for developing the cost estimating and baseline budget requirements defined in this System Description. This procedure defines the structure, requirements, and responsibilities for developing a baseline budget for projects where DOE Order 413.3B is required or on projects where an EVMS is deemed appropriate.

3.5.1 Cost Estimating

Project Managers (PM) are responsible for cost estimates of work scope under their direction including identifying the type of work and funding source. The PM is also responsible for establishing estimate type based on known scope (requirements and deliverables), schedule, pricing basis, and customer or sponsor requirements. Project estimates are classified according to DOE G 413.3-21, DOE Cost Estimating Guide into one of five categories. These classifications are based on the Association for the Advancement of Cost Engineering (AACE) Recommended Practice No. 18R-97. Generally, most cost estimates are classified as Class 5 (Order of Magnitude), Class 3 (Preliminary), or Class 1 (Definitive). These classifications will help ensure that the quality of the cost estimate is appropriately considered when applying contingency.

PMs and CAMs are responsible for identifying and documenting risk and contingency estimates as part of the baseline planning process. During the baseline planning process, risks and uncertainties are identified. To the extent possible, mitigation strategies are incorporated into the baseline budget and schedule to minimize project impacts. Risk or management contingency estimates are identified outside the baseline budget and schedule, and are based on the likelihood and severity of the uncertainty. Estimate uncertainty contingency is derived at the activity level within the body of the estimate (but not retained within the WBS, CA, or work package).

Cost estimating is a key component of the project baseline budget development process. Estimates are developed and maintained from project initiation through project completion. Cost estimates are created with enough levels of detail to identify CA resources and to take into consideration schedule activity durations. The cost estimate is prepared at the lowest level of the WBS and is activity based, consistent with the schedule and technical elements of the baseline scope of work. Estimates may be prepared for planning purposes to support hypothetical exercises or to evaluate potential pricing changes. Cost estimates support the development of the project's baseline budget and use a bottom-up, activity-based estimating methodology.

A consistent approach to cost estimating verifies that cost estimates meet all requirements, are based on standard requirements, are accurate, are traceable to technical requirements, and are consistent with generally accepted and sound industry cost estimating practices. Cost estimates also solidify the scope of work, providing a documented reference for identifying changes in scope and addressing future cost variances.

The Basis of Estimate (BOE) provides a narrative explanation of the rationale behind the estimating and pricing of the work scope. It contains a documented summary of planning assumptions, resource requirements necessary to perform the project scope of work, and explanation to support the identified resources. The BOE also identifies tools which were used in developing the estimate such as RS Means, prior cost experience, estimating databases, etc.

Labor and non-labor costs are stated in current FY rates and include overhead rates to arrive at fully burdened dollars. Future year escalated rates are developed consistent with Fermilab Finance Section guidance and applied based on the time frame that the future scheduled activities will be performed. Alternatively, projects may elect to evaluate escalation in specific areas outside the given rates and document any applied deviations from the norm in their project plans.

Fiscal year project/program management activities are estimated to the same level of detail as the project they support. Project cost estimates are prepared for the life cycle of the project and evolve as definitive design and construction information is established.

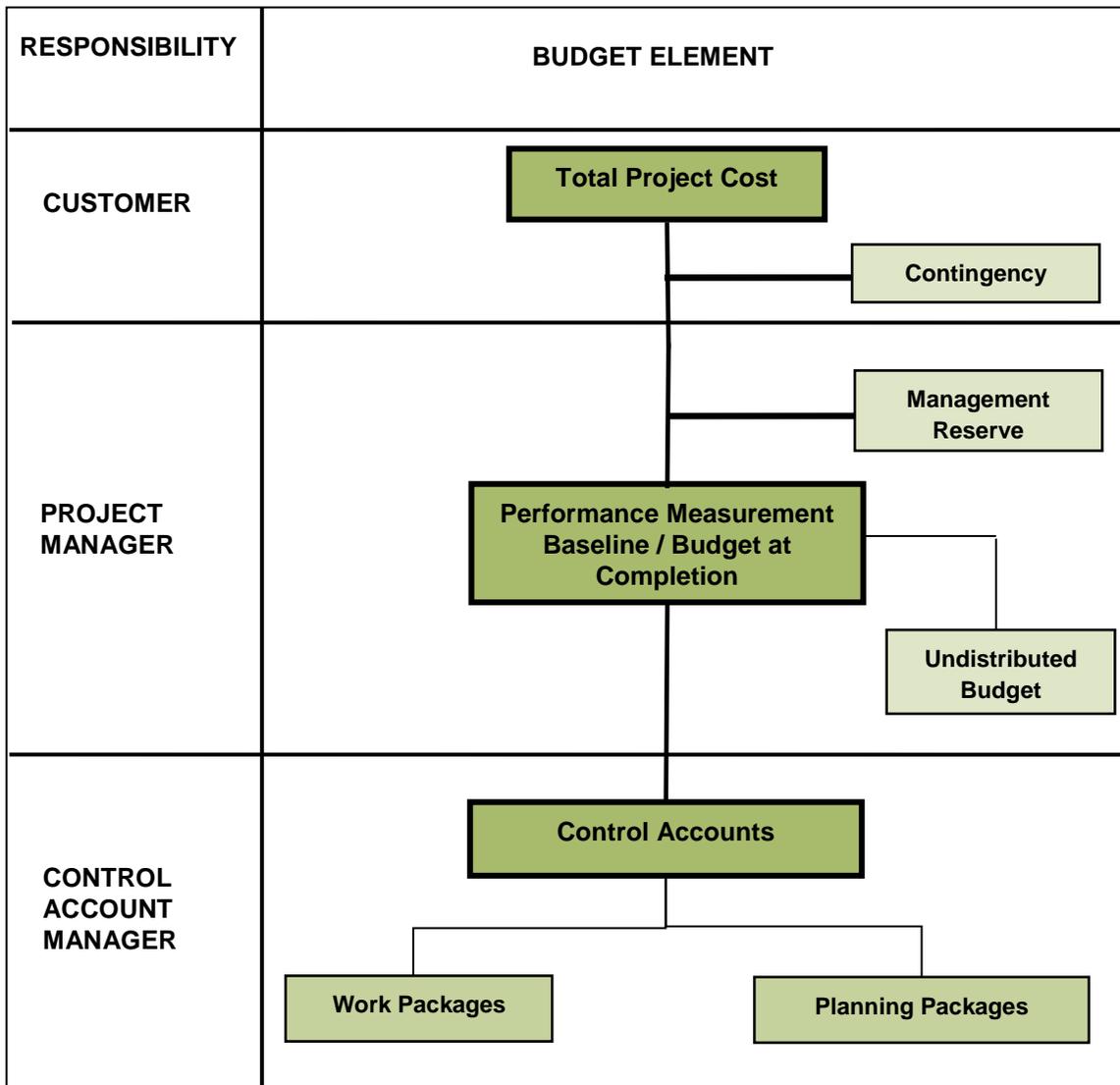
3.5.2 Baseline Budget

The project's baseline budget establishes the estimated cost of executing the project in accordance with the scope and schedule elements of the baseline. The baseline budget is also referred to as the Total Project Cost (TPC) and includes estimates for contingency. The project's total contingency includes a known risk component, including estimate uncertainty and identified risks from the risk management process, and an unknown risk component, which is often determined by top-down analysis based on experience. The project's baseline budget, excluding contingency, is referred to as the Performance Measurement Baseline (PMB). This is graphically shown in Figure 1: Project Baseline Budget Hierarchy. Other terms and components of the baseline budget and TPC include:

- **Total Project Cost (TPC):** The total project cost consists of all costs associated with a project, including contingency. It is the sum of all capital costs and the other project costs associated with the project, including engineering studies, conceptual design, construction, startup, and costs to complete transition and facility occupancy. (See [Figure 2: Project Cost Categories](#) for additional information.)
- **Management Reserve:** The portion of the project budget allocated by the customer and under the authority of the project for management control purposes rather than being designated for the accomplishment of specific tasks. Its purpose may also be pre-defined by the customer. It is not part of the Performance Measurement Baseline (PMB).
- **Contingency:** The portion of the project budget that the customer holds in reserve to accommodate known risks as well as unknown risks that are within the scope of the project. It may also be used for additional scope and work that is necessary to meet current project mission requirements or was inadvertently omitted but required. Contingency is not part of the PMB. (See section [3.6](#) for additional information)
- **Budget at Completion:** The sum of all project budgets, any summary level planning, and any undistributed budget. The Budget at Completion equals the Performance Measurement Baseline.

- **Performance Measurement Baseline (PMB):** The Performance Measurement Baseline is the time-phased budget plan against which project performance is measured. The performance measurement baseline is the sum of all budgets distributed to the project plus undistributed budgets. The PMB does not include contingency. The PMB is altered only through the change control process.
- **Control Account (CA) Budgets:** Distributed budgets planned in detail and allocated to specific CAs. Through the life of the project, the baseline budget is eventually distributed and planned in detail within CAs. The CA budget is the sum of the budgets for Work Packages and Planning Packages within each CA.
- **Work Package Budgets:** Natural subdivisions of CA budgets that constitute the basic building blocks in planning, controlling, and measuring project performance. Work Package budgets are directly traceable to activities and tasks planned in detail to support specific scopes of work.
- **Planning Package Budgets:** Those portions of a project CA for future work that is not yet practicable to plan at the Work Package (WP) level. Planning Packages (PP) are time-phased in accordance with known schedule requirements for resource planning. PP are refined as detailed requirements become clearer and the time to begin work draws nearer.
- **Distributed Budget:** Work Package and Planning Package budgets allocated as part of a project CA.
- **Undistributed Budget:** Budget associated with specific work scope or contract changes that have not been assigned to a CA or summary level planning package.
- **Authorized Unpriced Work:** Any change to the contract statement of work that has been authorized by the customer and is being worked on, but for which no price has yet been negotiated.

The time-phased baseline budget plus time-phased contingency must match the customer-provided funding profile for the project. For projects that include significant third-party subcontractors (i.e., A/E or General Construction Contracts), annual budget requirements are time-phased so that the project can maintain adequate schedule progress.

Figure 1: Project Baseline Budget Hierarchy


3.5.3 Control Account (CA) Planning

CA planning consists of those efforts needed to establish time-phased budgets for each CA identified for project execution. The CAM has the primary responsibility for developing and managing the CA budget. Project management provides CAMs with budget guidance and a common planning capability to perform resource costing, indirect rate applications, and other calculations. This is done in conjunction with the project controls staff.

CA budgets are a summation of the budgets for all the WP and PP assigned to the CA. Each WP and PP budget is calculated by applying each resource's rate to the resource level (e.g., hours or other units of effort or dollars for materials and other direct costs), factoring in escalation to actual year dollars and then applying the appropriate indirect burdens. Project management and the CAM come to an

agreement on the work scope to be accomplished as well as the accompanying budget and schedule necessary to support the required effort. Once these budgets have been developed, the amount of budget associated with each monthly accounting period is referred to as the Budgeted Cost of Work Scheduled (BCWS). The total budget with respect to any given grouping of work is called Budget at Completion (BAC).

Although records can be kept at lower levels of detail, the lowest required level of detail for maintaining the BCWS and the BAC is the CA. CA budgets may be further subdivided into one or more WPs and/or PPs in the project schedule. The CAM selects the Performance Measurement Technique (PMT) – the method for measuring the work performed for each work package. Only a single PMT may be used on each WP. CA budgets in the EVMS are governed by the following guidelines:

- The sum of budgets for WPs and PPs equals the CA BAC value.
- The CAM must be able to provide the basis for the budgets of all WPs and PPs.
- The start and completion dates for each WP fall within the scheduled start and completion dates of the CA to which the WP is assigned.
- Retroactive changes to budgets for completed efforts are prohibited except for the explicit correction of errors.

Re-planning future portions of open and unopened WPs and PPs require formal change approval, consistent with Change Control (EVMS Procedure 12.PM-007).

3.5.4 Acquisition Planning

Projects often subcontract with external suppliers, contractors, and collaborators for work associated with projects. Examples include architecture/engineering (A/E) firms, general and specialty contractors, other national laboratories, research institutions, and consultants. These subcontracts may be executed through Firm-Fixed Price (FFP), Time and Material, or Level of Effort (LOE) support type contracts. The contracting vehicle type is determined based on the nature of the work to be subcontracted as well as its complexity, risk, and cost. At Fermilab, all acquisitions are made in accordance with the requirements of Fermilab's prime contract with DOE and where applicable, Fermilab policies and Illinois state law.

3.5.5 Overhead Budgets

At Fermilab, the financial management system has a documented process, and the Finance Section is the identified organization responsible for managing, monitoring, and distributing overhead costs. Indirect costs and overhead rates are for common Laboratory activities that cannot be identified specifically for a project and are budgeted and controlled separately at the Laboratory level and approved annually by the DOE. Approved forward pricing rates and projected overhead rates beyond the current year are also maintained within the Fermilab financial management system.

3.6 CONTINGENCY, MANAGEMENT RESERVE, AND UNDISTRIBUTED BUDGET

3.6.1 Contingency and Management Reserve

Contingency is an element of the approved Total Project Cost (TPC) that is identified early in the project development and provides a budget that covers future known and unknown risks of the project but is not part of the PMB. Initial contingency is calculated as $TPC - BAC$. Contingency remaining at any point in the project can be calculated as $contingency = TPC - EAC$. The contingency budget is identified by the customer and the project for managing known and unknown risks as well as directed scope changes. Known risks include both risks documented in the project risk register and inherent uncertainties in the project's cost estimate. The total contingency amount may be set at the direction of the customer, or

jointly between the customer and the PM. It will be identified as a separate budget line in the EVMS reporting. The release of this budget is managed through the change control process and determined by approval thresholds defined in the PEP and PMP. The customer will determine the final disposition of any unused contingency as the project comes to completion.

Management Reserve is the portion of the project budget allocated by the customer and under the authority of the project for management control purposes rather than being designated for the accomplishment of specific tasks. The customer will determine whether it will be used on each project and, if so, its purpose may also be pre-defined by the customer. It is not part of the PMB.

3.6.2 Undistributed Budget

Undistributed Budget (UB) is budget applied to the contractually authorized effort that cannot be identified to specific Work Breakdown Structure (WBS) or organizational elements in a timely manner. The establishment of UB may be necessary when project changes are authorized too late in an accounting month to be distributed in that month. UB is used to accommodate temporary situations where time constraints prevent adequate budget planning or where contract effort can only be defined in very general terms. UB should be allocated into CAs in the current or the following accounting period, or as soon as practical. For authorized work that has not been negotiated, the project may maintain budgets in the UB account until negotiations have been concluded, allocating budget only to authorized related work that will start in the near term.

In order to assure that the budget for newly authorized efforts remains tied to the associated scope during the initial planning process, UB is a short-term holding account. Once the responsible organization(s) has been identified, the budget will transfer from UB to the appropriate CA(s). This ensures budget and scope will not be transferred independently. One use of UB is to account for authorized changes for which there has not been adequate time to plan the changes in detail at the CA level (Authorized Unpriced Work). UB is tracked in the Project Baseline Log and reported in the monthly report.

3.7 WORK AUTHORIZATION

Work authorization ensures that all work performed on the project has been contractually authorized and properly planned prior to its execution.

3.7.1 External Work Authorization

On DOE projects, the DOE Federal Project Director is responsible for granting authority to perform projects. Work authorization for non-DOE projects follows customer-specific authorization processes. On DOE projects, documentation is prepared for review by DOE representatives prior to each Critical Decision to support the work authorization process. Upon successful completion of this review, the DOE Acquisition Executive (AE) issues a Critical Decision approval and a written authorization for FRA to perform work consistent with the approved baseline plan. Once an external customer work authorization is received, and funding allocations are made, project work is performed consistent with the integrated baseline technical, schedule, and budget elements.

3.7.2 Internal Work Authorization

The objective of the internal work authorization process is to ensure that all defined project work is authorized by the PM and formally communicated to the appropriate and responsible CAM. The work authorization process involves management approval of the expenditure of project resources, by a responsible individual, to accomplish a specified scope of work within the agreed to budget, schedule, and technical objectives. The work authorization process utilizes the products of the baseline

development process to provide specific direction to the performers of the work. It assures that work assigned to responsible individuals, time-phased budget estimates, and work schedules are all integrated with each other and are related to the WBS within the funding limitations on the project. Formal work authorization provides a means for effective internal coordination, communication, and a process to obtain the required management approvals before work begins.

The total authorized work scope, budget, funding, and contractual commitments are released to the CAMs using Control Account Plan/Work Authorizations, a sample of which is included in Work Authorization (EVMS Procedure 12.PM-003). Formal work authorization with signed documentation begins at the same time as earned value reporting. For DOE projects, this will be sometime between CD-1 and CD-2.

The PM delegates work down to the CAMs within the authority provided in Control Account Plan/Work Authorization form. The work authorization provided in each CA includes the relationship to the WBS element or elements, responsible organization identification, CA task description, schedule, and time-phased budget in dollars or hours. This may be represented using applicable attachments to identify work scope, budget, resource commitments, CA, WBS, and schedule. All project work scope is planned, and formal work authorization occurs before the expenditure of any project funding is allowed. All work and expenditure authorizations are managed by the PM. The signing of a work authorization document by all parties represents a multilateral commitment to authorize and manage the work within the budget and agreed-upon schedule. The approved CA plan/work authorization agreement can only be changed through the project's formal change control process.

3.8 SUBCONTRACTOR AND COLLABORATOR PLANNING

When substantial effort associated with large and complex projects is obtained through subcontracts or partnering with collaborating laboratories and universities, the subcontracts and purchase orders must be written in such a way that information required for earned value management may be readily obtained from the subcontractor/collaborator. The request for proposal for subcontracts, Memorandums of Understanding (MOU), or Statements of Work (SOW) for collaborators must include a full description of the reporting requirements.

3.8.1 Subcontracts with Flow-Down

Contracts that have a high dollar value and high-risk may require reporting of earned value as part of contract performance. These subcontracts require careful planning prior to solicitation and award. The solicitation (Request for Proposal) and ultimately the contract must include the full description of the monthly earned value and performance reporting requirements from the subcontractor to the project.

3.8.2 Subcontracts without Flow-Down

The method of payment to non-EV flow-down subcontractors and to collaborators will generally drive the planning for receipt of cost and schedule information required to perform earned value management. For most subcontracts, payment will be made based on the achievement of planned milestones or, for design and construction, the percentage of completion of those milestones or on the basis of cost reimbursement for labor hours expended and materials consumed. Information provided by the subcontractor with requests for payment must be sufficiently detailed that accurate cost information can be incorporated in the earned value reporting.

For collaborator purchase orders, payment will be made based on the terms of the MOU or SOW, typically for items produced or labor expended.

An EV flow-down requirement is not mandatory for collaborators or for any of the following types of subcontracts:

- Firm Fixed Price (FFP)
- Time and material
- Support subcontracts that are primarily Level of Effort (LOE)

4. ACCOUNTING CONSIDERATIONS

For FRA projects at Fermilab, financial data accumulation, and management for projects is performed within the established financial systems. All financial transactions are documented, approved, and recorded properly in the financial accounting system on a consistent and timely basis in accordance with Generally Accepted Accounting Principles (GAAP), DOE Orders, FRA contract requirements, and applicable Cost Accounting Standards. Any change in Fermilab's accounting practices that may have a material impact on the financial data must be approved by the Laboratory's Chief Financial Officer (CFO). In accordance with Fermilab practice, the CFO has been delegated the authority to direct and monitor adherence to generally accepted accounting principles to ensure compliance with all applicable laws, regulations and contractual requirements.

Fermilab's latest DOE approved "Cost Accounting Standards Disclosure Statement" describes the methodology for handling various actual costs and addresses the methodology for direct and indirect costs.

4.1 ACCOUNTING PROCESSES

The comparison of actual costs and the work accomplished with baseline plans generated during the planning and budgeting phase is included in internal and external reports. Forecasts of future costs and schedule dates are made, and corrective actions are initiated when problems are identified.

4.1.1 Objective

The objective of the accounting process is to provide an accurate and timely recording and reporting of the actual costs associated with all project work.

4.1.2 Cost Code Structure

The cost code structure for each project is developed in conjunction with the development and integration of planning, scheduling, and assignment of work scope/task to the responsible organization. Subsequently, these planning tasks lead to the creation of CA numbers (projects and tasks) in the financial accounting system that identifies the correct chargeable task code, and CA, for specific items of work.

The Project Office submits a request to Finance to open a chargeable task code in the financial accounting system for collecting actual costs. See Control Accounts, Work Packages, Planning Packages (EVMS Procedure 12.PM-002) for more details.

All direct labor, material, subcontracts and other direct costs (ODC) are charged directly to the chargeable task codes associated with the CAs that are assigned at the job or task level. Indirect charges also accumulate in these codes, applied as rates to the appropriate direct charges. The established project cost code structure will ensure that actual costs are collected so that direct comparison with associated budgets can be made at the appropriate WBS level(s). The selected account assignment scheme will assure that:

- Direct and indirect costs are recorded in a manner consistent with the budgets.
- Direct and indirect costs can be summarized from CAs into the WBS without allocation of a single CA to more than one WBS element.
- Direct and indirect costs can be summarized by the project's organizational elements without allocation of a single CA to more than one organizational element.

4.1.3 Cost Accumulation

Actual costs are processed through various subsystems and are accumulated in the Fermilab Accounting System. The direct costs are identified by CA expenditure types, and the indirect costs are allocated via pre-approved indirect rates. All costs reported in the Fermilab Accounting System are transferred into the earned value management system as the ACWP or actual cost. After transferring actual costs into the earned value management system, project costs are reconciled to the Fermilab Accounting System.

4.1.4 Direct Costs

A direct cost is any cost that is specifically identifiable with or attributable to a project. Therefore, direct costs include any costs identifiable with the assigned tasks of a specific project. These costs include labor, travel, subcontract, and procurement costs or any other costs directly associated with a specific project.

All labor, materials and other applicable costs are charged directly to final cost objectives to the maximum extent practical. Costs are accounted for as direct cost and charged to final cost objectives according to Cost Accounting Standard guidelines as documented in the Fermilab Cost Accounting Disclosure Statement.

Each direct labor employee allocates their time worked on a periodic basis via FRA's time and effort reporting system. The effort is recorded, direct labor dollars are charged to the project CAs, and reports are available monthly from the financial system.

4.1.5 Material Cost and Accounting

Encumbrances are recognized at the point an approved order is placed. Equipment and material costs enter the general ledger through the accounts payable system. When an invoice is received, the accounts payable group applies the invoice to the appropriate Purchase Order (PO), and the cost is recorded. If further approvals are required, or if receipt of goods has not been entered into the system, the invoice is placed on hold. Once the receiving department has recorded receipt in the procurement system or the PO requestor acknowledges physical receipt of materials by signing the invoice or sending electronic approval, invoices are approved for payment. The hold is then released, and the payment is processed by the accounts payable group. The receipt of materials in the procurement system provides the system with information needed so that monthly accruals are automatically recorded for items that have been received but not invoiced. Additionally, Fermilab accounting procedures are in place to record receipt of material not physically received at Fermilab. This allows project management to record estimated actual costs in cases where value has been earned, but invoices have not yet been received.

4.1.6 Subcontract Cost

Subcontract costs are entered into Fermilab's project accounting system via the accounts payable system when an invoice is received and applied to a specific PO. The same procedures referred to in the Material Cost and Accounting section is used to record monthly accruals for un-invoiced subcontract costs.

4.1.7 Accounting Adjustments

Retroactive adjustments to a previous period's reported actual costs are prohibited. Adjustments are recorded in the current accounting period. Redistribution of indirect variances is done at year end, but the incremental change is recorded in the current accounting period. Prior accounting periods are not restated.

4.2 INDIRECT COST PLANNING AND CONTROL

4.2.1 Objective

Fermilab maintains a cost accounting system that allocates indirect costs to projects and tasks. Indirect costs are collected in discrete cost pools and distributed to the individual project beneficiaries via published rates that are formally reviewed and approved by the CFO. The CAS Disclosure Statement identifies all indirect cost pools with a discrete and specific set of cost objectives or beneficiaries.

4.2.2 Indirect Cost Pools

As described in 4.2.1 above, the CAS Disclosure Statement identifies all indirect cost pools and defines how these cost pools are distributed to the final or benefiting cost objectives. Some of the larger cost pools (relative to the total mix of indirect cost pools) at Fermilab are labor burdens, program support burden, materials and services burden, common site support, and the general and administrative cost (G&A). The current CAS Disclosure Statement may be obtained from the CFO.

4.2.3 Allocation of Indirect Costs to Projects

Indirect costs are allocated using individual rates that are applied to the base cost of discrete and specified resources (labor, procurements, services, etc.). The basis of each cost allocation is reviewed annually by the CFO to assure that each indirect cost pool is appropriately identified with the correct set of beneficiaries. As explained in 4.2.1 and 4.2.2, the composition of each indirect cost pool and the beneficiaries associated with each indirect cost pool are fully disclosed within the CAS disclosure statement.

4.2.4 Revisions to Indirect Rates

On a few occasions, a new program, project, or business requirement(s) present themselves in the current year that could not be anticipated when rates were estimated. Accordingly, revisions to current-year rates and out-year rate projections may be necessary. Fermilab strives to conduct current-year operations to reduce or eliminate revisions to current year rates. Revisions to current-year pricing structures are reviewed for compliance with Cost Accounting Standards (CAS). Rates are adjusted at least annually to redistribute rate variances.

Significant changes to the indirect allocation methodology require revision of the CAS Disclosure Statement and approval by DOE.

4.3 MATERIAL ACCOUNTING

EIA-748-C Guideline 20 applies to manufacturing processes. FRA projects are generally research and development projects, and therefore do not need to implement procedures for unit cost, equivalent unit cost, or lot costs, because they do not produce identical products for multiple customers. EIA-748-C Guideline 21 also applies to manufacturing processes. Most projects do not bulk order material for project work, and therefore do not need to implement procedures for residual inventory tracking. Each project will determine whether either of these principles apply and if so, will address them in their Project Management Plan document.

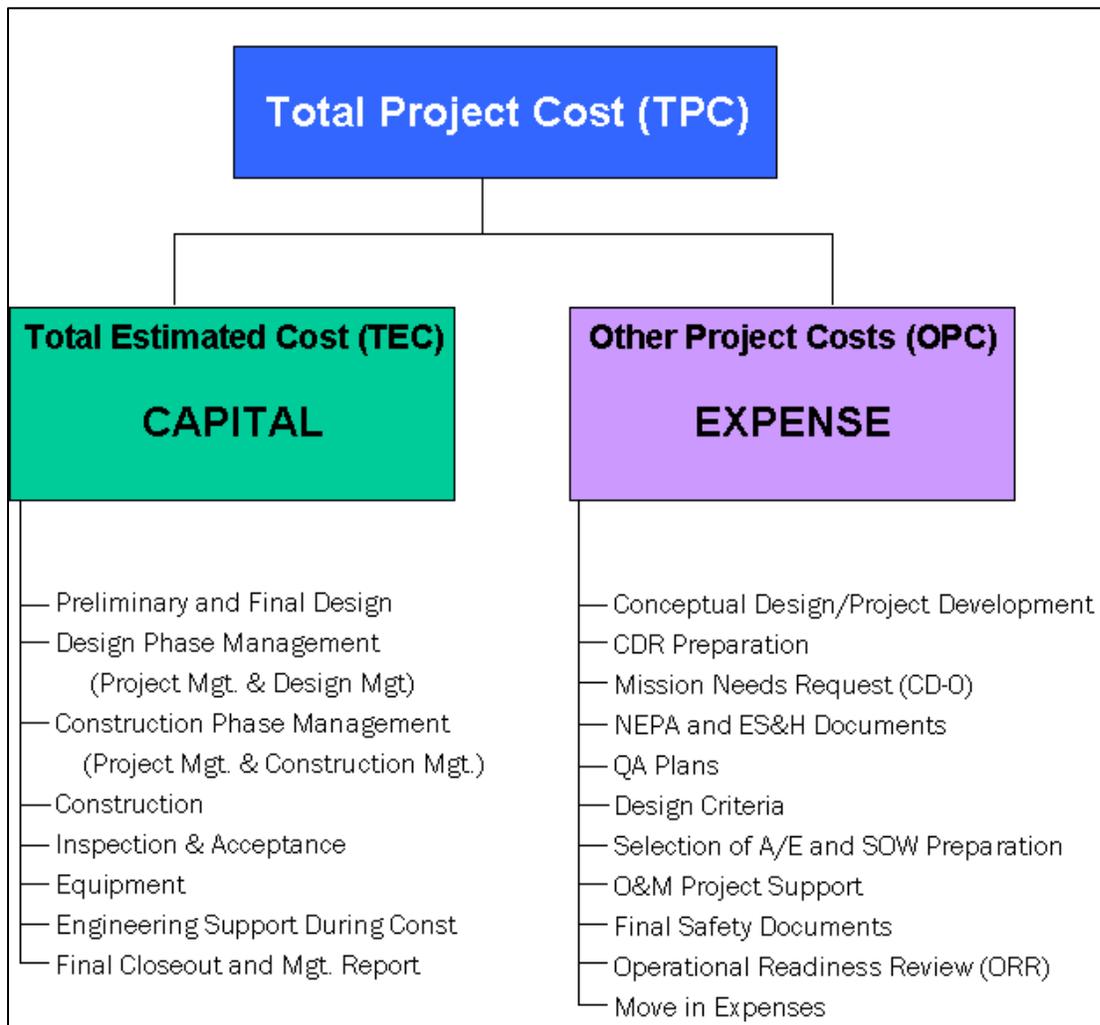
4.4 BURDENED COSTS

Direct costs and any associated indirect burdens are typically budgeted at a work package level. Direct costs and any associated burdens are collected at the chargeable task code level and then summarized up to CAs through the project WBS. The combination of direct costs and the associated indirect costs is referred to as burdened costs. In accordance with standard accounting practices, costs are segregated into two categories – Capital and Expense.

Capital costs include more tangible and obvious elements of a project such as buildings, structures, infrastructure, and equipment. It also includes final project design, the cost of land and improvements, certain software/hardware and development costs, special and standard equipment, major computer systems, site services, and project management. Fermilab follows DOE guidance of capitalizing assets, which is defined in the Cost Accounting Standards Disclosure Statement and financial procedures.

Expense costs include all costs incurred during the conceptual planning of a project such as Mission Needs Requests, Demolition and Decontamination (D&D), writing the CDR, preparing ESH, Quality Assurance, and NEPA documentation, and other project support functions through the life cycle of the project. It also includes R&D, commissioning, and pre-operating costs.

Figure 2: Project Cost Categories



Project Cost Categories illustrate some of the major categories that fall within each portion of the budget.

5. ANALYSIS AND MANAGEMENT REPORTS

The Performance Measurement Baseline is used to measure, analyze, and evaluate project performance. Project variance thresholds provide the parameters for monthly project variance reporting. The Monthly Report identifies both the current period and cumulative project performance parameters based on variance analysis. The report may also recommend corrective actions, as appropriate. Management actions related to change control are implemented as prescribed in DOE Order 413.3B or through other customer reporting requirements.

The performance analysis and reporting process consist of comparing the planned budget, schedule, and technical progress to actual cost, schedule, and technical performance effectiveness. This process is designed to: (1) identify technical or performance issues which could result in the project's inability to meet performance or scope objectives; (2) identify positive and/or negative cost and schedule variances; (3) identify the causes of meaningful variances; and (4) update cost at completion estimates.

Monthly Status Reporting (EVMS Procedure 12.PM-006) describes how performance information is analyzed and reported by the project manager to document cost, schedule, and technical performance.

5.1 PERFORMANCE MEASUREMENT

(Excerpt from the Project Management Institute Practice Standard for Earned Value Management, 2005.)

“Earned Value is a measure of work performed. Techniques for measuring work performed are selected during project planning and are the basis for performance measurement during project execution and control. Performance measurement techniques should be selected based on key attributes of the work, primarily the duration of the effort and the tangibility of its product.”

Work packages (WP) are established during the planning and opened when the Budgeted Cost of Work Scheduled (BCWS), is expected to occur. Each WP uses one Performance Measurement Technique (PMT) to track work progress. The PMT is specified by the CAM and adheres to the following:

- **Stability:** One PMT is chosen for each WP. Once the project has established the PMB, the selected PMT can only be changed in accordance with the change control process.
- **Objectivity:** Completion of an event (for discrete work) is based on predetermined criteria or tangible product.
- **Ability to audit:** The procedure and criteria for evaluation will facilitate an audit of the Earned Value (EV), or Budgeted Cost of Work Performed (BCWP) reported.

5.1.1 Performance Measurement Techniques (PMT)

The CAMs specify the performance measurement technique for each of the WPs they manage. PMTs should be consistently applied to similar WPs across a project. PMTs should be applied such that objective measurements can be made at appropriate intervals to demonstrate progress on the activities to which they have been assigned.

The performance of separate and distinct work efforts that are related to the completion of specific and tangible end products or services and can be directly planned and measured is called discrete effort. In comparison, effort applied to project work that is not readily divisible into discrete efforts for that work, but which is related in direct proportion to measurable or discrete work efforts, is called apportioned effort. A support-type activity that does not produce definitive end products is referred to as Level of Effort (LOE). See Project Scheduling (EVMS Procedure 12.PM-004) for further guidance.

5.1.1.1 Discrete Effort

Work performance is measured and reported monthly. Whenever possible, objective methods are used to determine work performance. For example, units completed compared to total planned units provides an objective measurement of percent complete.

5.1.1.2 Level of Effort (LOE)

Some project activities do not produce tangible outcomes that can be measured objectively. Examples include project management, operating a project's technical library, and the like. These activities consume project resources and should be included in EVMS planning and measurement. In these cases, the LOE technique is used for determining earned value. A planned value is assigned to each LOE task for each measurement period. This planned value is automatically credited to the earned value at the end of the measurement period.

LOE activities will never show a schedule variance. Consequently, the technique biases the project data toward an on-schedule condition. LOE should be used conservatively and should only be considered when the task does not lend itself to a more objective measurement technique.

5.1.2 Status and Earned Value Calculation

Performance status is determined during the implementation of the project plan. Monthly, actual project work, schedule, and cost data are collected and then compared to the PMB using an earned value methodology. See Project Scheduling (EVMS Procedure 12.PM-004) for further guidance. Ensuring the collected data are valid and accurate is crucial to producing credible progress status reports. This knowledge of the project status aids all levels of project management in taking proper corrective action when deviations to the project's plan surface. The objective of measuring schedule progress and calculating earned value is to accumulate, analyze, and report the project's current period and cumulative-to-date actual performance and cost compared to planned performance and cost.

5.1.2.1 Performance Measurement Data

The cost/schedule performance measurement information provides visibility into the project cost/schedule status as it relates to completed work and forecasted work remaining. This information is accumulated monthly for each CA and is summarized directly through the WBS structure to obtain the cost/schedule status at any level of the structure. The primary sources of this information are as follows:

- **Budgeted Cost of Work Scheduled (BCWS)** is the time-phased budget that represents the value of work to be accomplished through given time.
- **Budgeted Cost of Work Performed (BCWP)** is a measurement of the work completed. As work is completed, the budget associated with this work is "earned."
- **Actual Cost of Work Performed (ACWP)** is the cost for work that has been completed or partially completed (actual cost-plus accruals). Actual costs are accumulated in the Fermilab Accounting System by CA or rolled up to the CA level if collected at lower level chargeable task codes. Accruals are routinely added through Fermilab's accounting system when the CAM or PM determines that some accomplished work has not been invoiced in the month earned, through consultation with affected parties and with accounts payable. Accruals and other adjustments to actual costs must originate in Fermilab's accounting system using the Lab's established procedures.
- **Budget at Completion (BAC)** is the total budget for a given work scope. The BAC for the total project plus contingency equals the total project cost (TPC). The BAC for lower-level WBS elements, CAs, and work packages equals the cumulative BCWS up to and including the last

period to which it is assigned.

5.1.2.2 Evaluation of Planned Value

The time-phased budget (BCWS) represents the plan against which performance is measured. At the CA level, the baseline is the result of assigning the necessary resources to the scheduled tasks (work packages) as part of the process of detail planning for the CA. The process includes identifying the tasks, scheduling the tasks, identifying the resources, and determining the PMT. Work to be accomplished in a CA must be performed in a logical, consistent manner to help provide consistency in determining the baseline and accomplishing the work. To avoid unrealistic variances, the BCWS is established according to the CAM's decision on how the work is to be accomplished, and the PMT is selected to ensure that BCWS is achieved in the same manner as the BCWS was planned.

The accuracy of determining actual performance is directly related to the ability to determine progress objectively within a given work package or CA. Consequently, LOE tasks should only be used in those WPs that have no deliverables or other material means of determining actual progress. The earned value of LOE only documents the passage of time and not actual project progress. Consequently, within a CA, the mixing of LOE activities with discrete effort activities should be minimized to prevent distortions of the performance measurement data at the CA level. When LOE work is combined with discrete work within the same CA, segregated WPs or Chargeable Task Codes should be established for the discrete and LOE portions.

5.2 PERFORMANCE ANALYSIS

Analysis of performance measurement data will allow project management to identify and document the cost, schedule, and work scope conditions that may require management attention, assess the impact of these conditions on the baseline and future work, then develop and implement corrective actions as necessary. This subsection establishes the minimum requirements and guidance for performance analysis for projects: specifically, variance analysis, corrective action, and updating Estimates at Completion (EAC).

5.2.1 Variances

Schedule Variance (SV) compares the value of the work completed (BCWP) to the value of the work scheduled (BCWS). SV is calculated by subtracting BCWS from BCWP, providing a dollar value for schedule variance ($BCWP - BCWS = SV$). Care must be exercised in drawing inferences from either favorable or unfavorable schedule variances because of the influence of high-value work performed out of sequence. Crosschecks must be made using the scheduling system to determine the true status of the schedule. However, a positive schedule variance may indicate the work is being performed ahead of schedule, and a negative schedule variance that the work is behind schedule.

Cost Variance (CV) represents the difference between the budgeted value of the work completed (BCWP) and its actual cost (ACWP). CV is calculated by subtracting ACWP from BCWP ($BCWP - ACWP = CV$). A positive cost variance indicates that work was performed for fewer dollars than planned. Conversely, a negative variance indicates that work was performed for more dollars than planned.

Estimate at Completion (EAC) provides an estimate of the final total cost of a project. It is the project's latest revised estimate for the given work scope represented by adding cumulative ACWP to ETC. See also section 5.2.6.

Estimate to Complete (ETC) is the latest revised estimate for the remaining work scope, generally

performed by the CAMs. See also section 5.2.6.

Variance at Completion (VAC) is the amount of underrun or overrun forecast for the work scope being considered, without regard to the use of contingency. It is calculated by subtracting EAC from BAC ($BAC - EAC = VAC$).

5.2.2 Variance Analysis

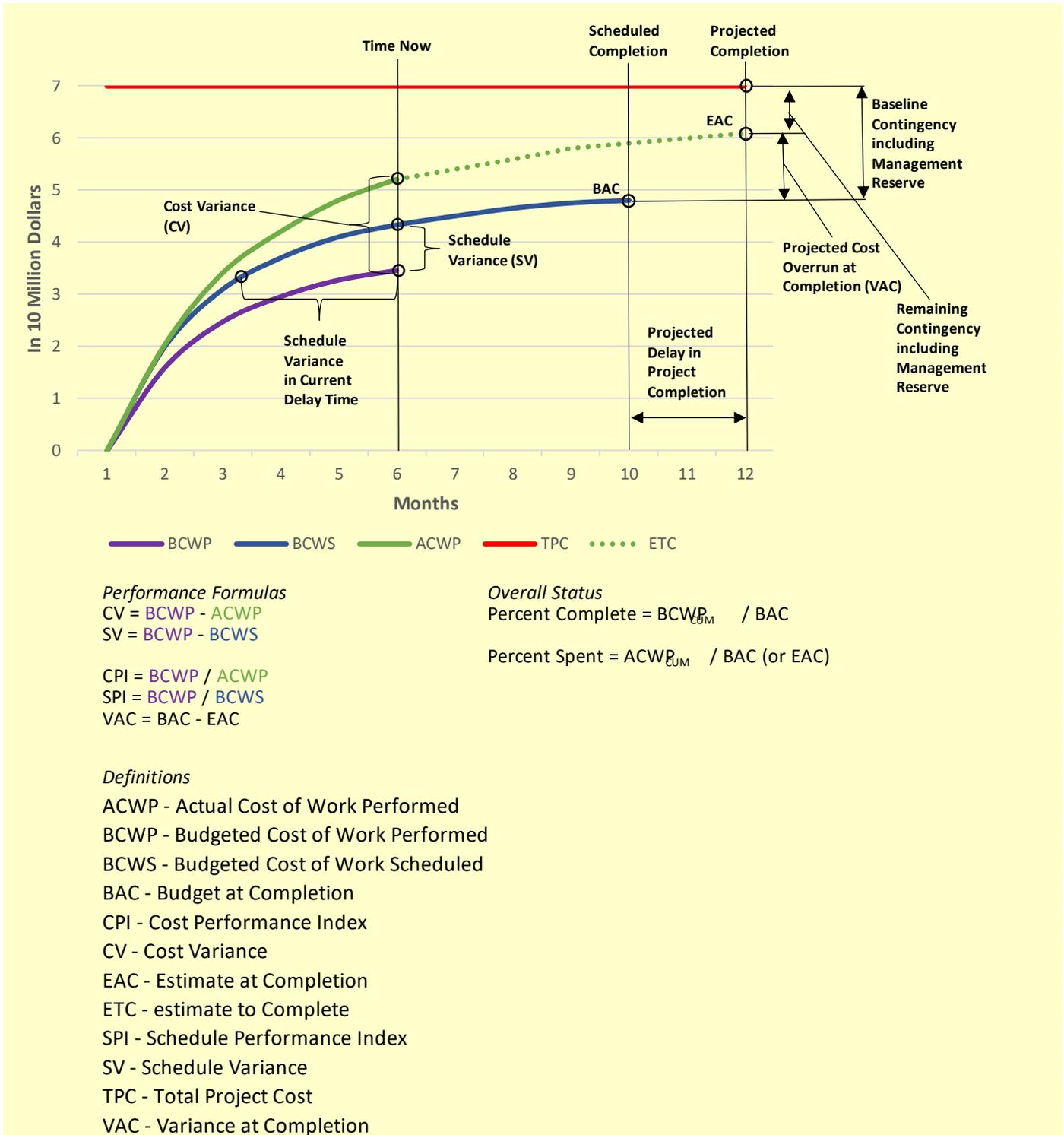
Variance analyses allow CAMs to identify and communicate cost, schedule, and EAC divergences from the performance measurement baseline. Root-cause analysis is performed at the CA level at a minimum. The CA structure is integral to the WBS and will accurately summarize budgets, earned value, actual costs, and the associated variances up through both the WBS and the project organization. Variance analysis at levels above the CA may be performed in support of internal management needs and DOE requirements.

5.2.3 Performance Indices

The CAMs will apply various metrics to assess the performance of their assigned CAs. These performance metrics will provide additional insight and a basis for the CV and SV analysis. All metrics will be updated at least monthly. The metrics employed should be for both current and cumulative performance. Time-phased metrics include a Cost Performance Index ($CPI = BCWP/ACWP$) and a Schedule Performance Index ($SPI = BCWP/BCWS$). The CAM will assess the cumulative metrics to look for CA performance trends. Other metrics include cost variances and schedule variances. Graphics are used to aid in displaying trends associated with project performance. Performance graphs are useful in communicating project performance objectives and in displaying progress toward meeting those objectives.

Figure 3: Earned Value Data Elements is an example of a commonly used time-phased EVMS metrics where the trend lines are all expressed in project dollars. The middle (orange) line is the BCWS, the planned work as defined in the current Earned Value Management Baseline. The top (green) line, the ACWP, which shows the actual project cost. The bottom (blue) line, the BCWP, shows the actual work accomplished for the period. As illustrated in the graph, the schedule variance SV is the difference between BCWP and BCWS; the cost variance CV is the difference between BCWP and ACWP. This illustration also demonstrates the functionality of such metrics, by showing various Earned Value elements such as projected cost overrun, baseline contingency, remaining contingency, etc.

Figure 3: Earned Value Data Elements



5.2.4 Variance Thresholds

Variance analysis is conducted if any current period or cumulative SV or CV is outside the thresholds established in each project's Project Management Plan. Monthly Status Reporting (EVMS Procedure 12.PM-006) provides threshold guidance for projects. Following guidance found in the Monthly Status Reporting procedure, Project management may customize thresholds to respond to the project and customer needs.

5.2.5 Control Account (CA) Performance Analysis

The CAMs prepare variance analysis statements or explanations for each CA exceeding established variance thresholds. The CAMs are responsible for determining the cause of the variance and its impact on the CA and the related activities, and milestones, developing a corrective action plan (as appropriate) and including this information in the appropriate sections of the monthly report.

CAMs periodically (at least annually) develop a comprehensive ETC at the CA level using all available information to arrive at the best possible estimate.

5.2.6 Project Performance Analysis

Project performance analysis is an ongoing process that includes routine, and ad hoc analyses of problem cause, corrective actions, risk analysis, and cost savings opportunities. The process is formalized via the monthly report, which includes a review of cost and schedule performance information, identification of significant problem areas, and the status of corrective actions.

CAMs periodically develop a comprehensive EAC at the CA level using all available information to arrive at the best possible estimate. The CAM may employ the following when developing the EAC:

- Evaluate the efficiency achieved by performing organizations for completed work and comparing it to remaining budgets.
- Establish a schedule forecast that reflects the expected time-frame for completing the remaining work.
- Consider all remaining risk areas on the project versus cost avoidance possibilities.
- Ensuring the most current direct and indirect rate structure is used to price out the projected resources.
- Apply analysis to future efforts to derive the most accurate estimate.

An EAC based on predictive performance measures increases the probability that the project is executed within the overall budget objectives. Monthly EAC reviews are essential for management decisions including the planning of project future funding requirements. Monthly, CAMs review the status of expended effort and the achievability of the remaining forecasted work using all available information to arrive at the best possible EAC.

Comparisons of the EAC to the BAC must be made with enough frequency for management to ensure project performance and resource availability is not adversely impacted. Routine EAC analysis and review at the CA level by the CAM ensures that the EAC continuously reflects a valid projection of project costs. The CAM can choose from a variety of methodologies to develop the estimate at completion. No single method consistently provides the "best answer." EACs should never entirely be formulaic. Formula driven Estimates at Completion are used as a means of verification or validation that an EAC is reasonable. The uncompleted baseline schedule activities and the resources required to complete each activity must be assessed in generating the EAC.

5.2.7 Monthly Project Status Calculations and Forecasts

As part of the monthly project status report, project management updates the EAC and analyzes it at the cost account level to account for all changes from the baseline that have been identified. The EAC update reflects a current analysis of project risks and includes all proposed Baseline Change Requests (BCR).

5.3 PERFORMANCE REPORTING

The objective of the reporting process is to provide accurate and timely reports needed by senior management, the project, and external customer management to manage the cost, schedule and work scope on the project. Utilizing the OPSS standard EVMS processing calendar, project management shall define a project-specific reporting calendar that is consistent with the project's monthly reporting cycle.

5.3.1 EVMS Reporting

Project management will provide regular reports to the customer and senior management on project status. The level, frequency, and distribution of reporting will be defined in the PEP. EVMS reporting shall begin at a time determined by Fermi Management to demonstrate the EVMS system is in place, effective, and tracking project progress. For DOE Order 413.3B projects, EVMS reporting into PARS II is required when baselined at Critical Decision (CD)-2 approval. The report is generated from schedule status information, cost status from the financial system, and internal monthly narrative progress reports prepared by the CAMs. The focus of this report is exception reporting. Significant problems or issues are highlighted, along with corrective actions taken or need to be taken. Corrective actions should be tracked to completion utilizing a Corrective Action Log or other methodology.

Once the project has received an approved PMB (at CD-2), monthly DOE reports are generated by project management as specified in DOE Order 413.3B. In addition, project management supports the Federal Project Director in preparing quarterly reports and presentations to the DOE Acquisition Executive.

5.3.2 Monthly Reporting Cycle

After CD-2, reports generated from the EVMS are updated and published monthly. The amount of data, number of people providing input, processing time, and other considerations require that an orderly process is used to collect, review, report, and use the data generated by the system. The purpose of the monthly report is to provide project management, senior management, and DOE a periodic assessment of each project by which to monitor and manage the project. These project status reports contain the following information:

- Financial summary
- Status of key milestones
- Progress narrative
- Baseline change control log actions
- Project management comments
- EVMS data
- Variance explanations (if required)

Annually OPSS provides a calendar for producing internal and external reports that allow for both quality checks and adjustments to the project plan. Typically, external monthly reports are to be submitted to the customer no later than the last day of the month that follows the month in which the work was performed. The month in which the work was performed is also known as the reporting period. To meet

this schedule, adjustments or validation of the RLS and ETC, as well as processing of BCR, must occur early in the cycle, most likely within the first 10 calendar days. Contract Performance Reports (CPRs) and Variance Analysis Reports (VARs) can then be produced and circulated to the project team and lab management for feedback before final submission to the customer.

6. CHANGE CONTROL

Change control ensures that any project changes are identified, evaluated, coordinated, controlled, reviewed, approved, and documented in a manner that best serves the project. This process is discussed in the EVMS Change Control Procedure 12.PM-007.

6.1 CHANGE CONTROL PROCESS

6.1.1 Objective

Change control has the following objectives:

- Delineates the methods used to ensure the integrity of the project's cost, schedule, and work-scope baseline.
- Enable the implementation of timely and auditable changes to the baseline.
- Ensures that no work is performed without prior authorization.

DOE Order 413.3B establishes change control requirements for DOE projects. All major projects will implement similar requirements in project procedures for change control. Change control processes begin after CD-1 for design activities (scope/budget/schedule) and between CD-1 and CD-2 for the working baseline. Change control processes continue when the performance measurement baseline is approved and are in effect through CD-4.

6.1.2 Change Documentation

Full control and accountability must be maintained over the PMB. A detailed change log is maintained to record all changes to authorized work and to reconcile original budgets and schedules with all changes for the WBS elements.

All BCRs to the performance measurement baseline made because of contractual changes, formal reprogramming, internal re-planning, or the use of the contingency are documented and reported to the customer, as required.

6.1.3 Change request and Implementation

Change control thresholds are defined in the PEP. All changes are recorded and tracked through the change control process. Each change is identified and assigned a unique change control number. The process for initiating a BCR is found in Change Control (EVMS Procedure 12.PM-007).

6.1.4 Change Request Timing

All changes to the baseline, with exceptions discussed below, must happen in the future beyond the Freeze Period and cannot change past or present data. The approval(s) of Baseline Changes must be complete before the end of the Current month, which is always on the last working day of the month that follows the Reporting month. However, implementation of changes must occur in a timely manner (normally within one reporting period of approval). Figure 4 shows this timing sequence for baseline changes.

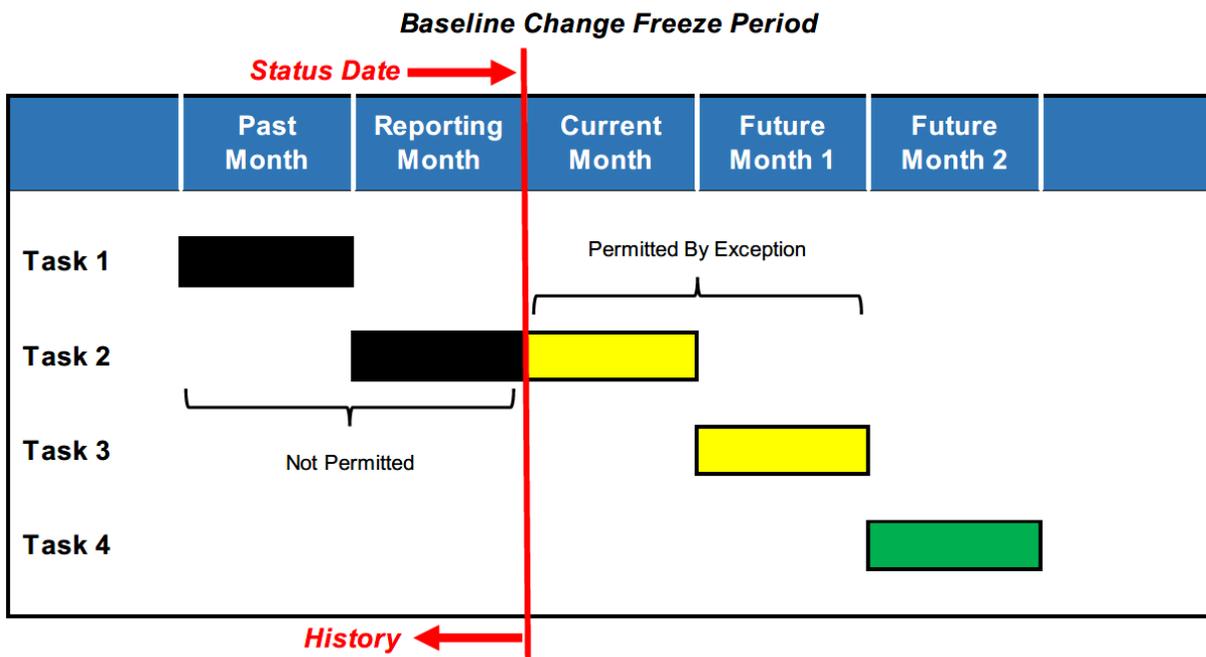
To minimize the risk of errors and the overcorrection of the baseline. Changes that affect the current month and/or next future month ("current plus one") are permitted only by the listed following exceptions which are given latitude to enact changes in the current period:

- Rate changes.
- Obvious errors such as typographical mistakes must be made as early as possible to ensure data integrity.

- Projects without an established PMB or are in the process of establishing the PMB.
- Contractual changes may include Statements of Work, subcontracts, large procurements, or field changes. Latitude is given to contractual changes because their complexity and long negotiations often make final issuance difficult prior to the current period.
- Changes in scope, or the nature of work, inside the freeze period is necessary to reflect proper planning and has the concurrence of Federal Project Director (FPD). Concurrence of necessity is indicated by FPD signing the BCR.

These exceptions must not change prior periods or history. Further clarification of the process for initiating and implementing a BCR is found in Change Control (EVMS Procedure 12.PM-007).

Figure 4: Baseline Change Timing and Freeze Period



6.2 CHANGE CONTROL CATEGORIES

Details on change control categories and methods of implementation are found in Change Control (EVMS Procedure 12.PM-007).

6.2.1 External (Directed) Changes

An external change is, usually, imposed on the project by the customer, with a directive to implement. Such a change affects one or more baseline elements (scope, cost, or schedule) and may include, but is not limited to:

- Customer directed and approved funding changes.
- DOE Program Secretarial Officer direction.
- New or revised DOE policy directives.

For changes proposed by the PM that would alter the project scope, the request would be made through the BCR process. Upon approval by the appropriate customer authority, a directed change would be made from the customer to the project.

Typically for DOE projects, the DOE Federal Project Director will provide written notice of the external or directed changes to project management. Unless specifically authorized in the written instruction, the change will be acted upon in accordance with the PEP configuration management process.

6.2.2 Internal Changes

The objective of an internal change is to reflect a more accurate, realistic project plan. It is sometimes necessary to perform re-planning actions that are within the scope of the project. These re-planning actions may be appropriate for future work when lessons are learned from completed actions. Such lessons may include reorganization of work or personnel to increase the efficiency or incorporation of different engineering or construction approaches. Administrative changes such as changes to the project organization or project management personnel including CAMs are also subject to the change control process.

Internal re-planning is intended for in-scope changes that relate to future work, i.e., work to be performed beyond the current performance period. Internal re-planning efforts are allowed on open Work Packages (WP) provided the past portion of the work already completed is not affected. All changes to the baseline are documented in a BCR and retained in project's electronic files. Changes shall not be implemented until the approval process described in the PEP has been completed. Approved changes are incorporated into the PMB in a timely manner, usually before the end of the next reporting period.

6.2.3 Formal Re-baselining

The formal re-baseline process is a comprehensive effort to re-schedule and re-budget the remaining work on the project. A re-baseline occurs when there is recognition by the customer and the PM that for the project baseline to continue to be a useful management tool, significant changes are necessary. Common reasons for a formal re-baseline to the PMB include substantial changes to funding profiles, subcontract bids being significantly higher or lower than budgeted, significant additions or changes to work scope that affects the budget and schedule of a project, or delays to schedules because of insufficient timeframes for acquiring approvals. Re-baselining can only occur with the future PMB and is to be avoided if possible.

6.2.4 Administrative Change

Those changes to the PMB that do not result in a technical, budget, or schedule change are administrative changes. Code fields that are under configuration control, such as Activity Codes and Resource Codes, can only be changed via an Administrative BCR. The Project Controls Lead will approve any Administrative BCR, with acknowledgment of the CAM and PM.

7. SURVEILLANCE AND MAINTENANCE PROCESSES

System surveillance and maintenance are the processes of reviewing the health of FRA's Earned Value Management System (EVMS) and making changes to actual implementation practices and procedures to ensure continued compliance with EIA-748-C guidelines and the approved FRA Earned Value Management System Description. Surveillance is monitoring and assessing, while maintenance is the effective administration of the improvements and corrective actions identified through surveillance.

7.1 SURVEILLANCE AND MAINTENANCE PROCESSES

7.1.1 Objectives

Effective surveillance and maintenance may result in two types of changes: (1) changes that result from a need to correct shortcomings, and (2) changes that represent opportunities for improvement. Surveillance and maintenance will be accomplished primarily through self-assessment and implementation.

7.1.2 System Surveillance

The objective of system surveillance is to provide a process for assessing the implementation of the FRA Earned Value Management System Description on required projects. Surveillance ensures that the system continues to fulfill the following functions:

- Provide valid, timely information that depicts actual conditions and trends.
- Provide timely indications of actual or potential project issues.
- Maintain baseline integrity.

7.1.3 System Maintenance

The objectives of system maintenance are as follows:

- Provide a process that will continuously improve the operation of the EVMS
- Ensure that all changes to the system are in conformance with FRA and DOE requirements
- Ensure that system documentation impacted by system changes is kept current

7.2 SELF-ASSESSMENT FOR SYSTEM SURVEILLANCE AND MAINTENANCE

FRA self-assessment is executed through a continuous quality control monitoring process and through periodic surveillance by knowledgeable and independent individuals. This process will be organized by OPSS on an annual basis for the overall EVMS. On new projects, OPSS will provide an assessment at the time of project baselining.

Continuous self-assessment is performed by each project's management and project control personnel, who are trained in the correct use of the FRA EVMS and are held accountable for proper implementation. Issues identified by project personnel are brought to the attention of OPSS. Issue resolution is coordinated by OPSS if the issue involves changes to the FRA Earned Value Management System Description or supporting Fermilab procedures.

The self-assessment and surveillance process will include the following specific activities:

- Projects will be reviewed with respect to EVMS compliance during Director's CD-2 reviews. OPSS is responsible for these reviews.
- The EVMS system will be periodically, but not less than annually reviewed against the EIA-748-C Guidelines. OPSS is responsible for these reviews.
- Recommendations from users to improve the Earned Value Management System will be

evaluated and implemented as appropriate, by OPSS.

PART 2: GUIDELINES AND LINKS

8. APPENDIX A: EIA-748-C GUIDELINE CROSSWALK

EIA-748-C Guidelines	FRA Earned Value Management System (EVMS) Implementation
Organization	
<p>Guideline 1: Define the authorized work elements for the program. A Work Breakdown Structure (WBS), tailored for effective internal management control, is commonly used in this process.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 2.1- Work Breakdown Structure <p>Procedures: 12.PM-001 <i>Project WBS, OBS, RAM</i></p>
<p>Guideline 2: Identify the program 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.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 2.3.1– Organizational Breakdown Structure Section 2.4– Project Execution Plan Section 2.5- Responsibility Assignment Matrix <p>Procedures: 12.PM-001 <i>Project WBS, OBS, RAM</i></p>
<p>Guideline 3: Provide for the integration of the company’s planning, scheduling, budgeting, work authorization and cost accumulation processes with each other, and as appropriate, the program work breakdown structure and the program organizational structure.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 2.1- Work Breakdown Structure Section 2.3.1- Organizational Breakdown Structure Section 2.5- Responsibility Assignment Matrix Section 3.1- Baseline Development Process Section 3.4- Planning and Baseline Scheduling Section 3.7- Work Authorization <p>Procedures: 12.PM-001 <i>Project WBS, OBS, RAM</i></p>
<p>Guideline 4: Identify the company organization or function responsible for controlling overhead (indirect costs).</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 4.2– Indirect Cost Planning and Control
<p>Guideline 5: Provide for integration of the program work breakdown structure and the program organizational structure in a manner that permits cost and schedule performance measurement by elements of either or both structures, as needed.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 2.1- Work Breakdown Structure Section 2.3.1- Organizational Breakdown Structure Section 2.5- Responsibility Assignment Matrix Section 3.1- Baseline Development Process Section 3.4- Planning and Baseline Scheduling <p>Procedures: 12.PM-001 <i>Project WBS, OBS, RAM</i> 12.PM-002 <i>Control Accounts, Work Packages, Planning Packages</i></p>
Planning, Scheduling, and Budgeting	
<p>Guideline 6: Schedule the authorized work in a manner, which describes the sequence of work</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 2.3.1- Organizational Breakdown Structure

EIA-748-C Guidelines	FRA Earned Value Management System (EVMS) Implementation
and identifies significant task interdependencies required to meet the requirements of the program.	<ul style="list-style-type: none"> Section 3.2- Risk Management Section 3.3- Technical Baseline Section 3.4 - Planning and Baseline Scheduling Section 3.7- Work Authorization <p>Procedures: 12.PM-003 <i>Work Authorization</i> 12.PM-004 <i>Project Scheduling</i></p>
Guideline 7: Identify physical products, milestones, technical performance goals, or other indicators that will be used to measure progress.	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 3.3- Technical Baseline Section 3.4- Planning and Baseline Scheduling Section 5.1– Performance Measurement <p>Procedures: 12.PM-004 <i>Project Scheduling</i></p>
Guideline 8: Establish and maintain a time-phased budget baseline, at the Control Account level, against which program performance can be measured. Budget for far-term efforts may be held in higher-level accounts until an appropriate time for allocation at the Control Account level. 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. On government contracts, if an over target baseline is used for performance measurement reporting purposes; prior notification must be provided to the customer.	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 3.4- Planning and Baseline Schedule Section 3.5- Cost Estimating and Baseline Budgeting Section 3.7- Work Authorization <p>Procedures: 12.PM-002 <i>Control Accounts, Work Packages, Planning Packages</i> 12.PM-005 <i>Cost Estimating</i></p>
Guideline 9: Establish budgets for authorized work with identification of significant cost elements (labor, material, etc.) as needed for internal management and for control of subcontractors.	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 2.3.1- Organizational Breakdown Structure Section 2.5- Responsibility Assignment Matrix Section Section 3.5– Cost Estimating and Baseline Budgeting Section 3.8– Subcontractor and Collaborator Planning <p>Procedures: 12.PM-005 - <i>Cost Estimating</i></p>
Guideline 10: To the extent it is practical to identify the authorized work in discrete Work Packages, establish budgets for this work in terms of dollars, hours, or other measurable units. Where the entire Control Account is not subdivided into Work Packages, identify the far term effort in larger Planning Packages for budget and scheduling purposes.	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 2.3- Organizational Responsibility Section 3.4- Planning and Baseline Scheduling Section 3.5- Cost Estimating and Baseline Budgeting <p>Procedures: 12.PM-002 - <i>Control Accounts, Work Packages, Planning Packages</i> 12.PM-004 - <i>Project Scheduling</i></p>

EIA-748-C Guidelines	FRA Earned Value Management System (EVMS) Implementation
	12.PM-005 – <i>Cost Estimating</i>
Guideline 11: Provide that the sum of all Work Package budgets plus Planning Package budgets within a Control Account equals the Control Account budget.	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 3.4- Planning and Baseline Scheduling Section 3.5-- Cost Estimating and Baseline Budgeting <p>Procedures: 12.PM-002 – <i>Control Accounts, Work Packages, Planning Packages</i> 12.PM-004 - <i>Project Scheduling</i> 12.PM-005 – <i>Cost Estimating</i></p>
Guideline 12: Identify and control level of effort activity by time-phased budgets established for this purpose. Only that effort which is immeasurable or for which measurement is impractical may be classified as level of effort.	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 3.4- Planning and Baseline Scheduling Section 3.5- Cost Estimating and Baseline Budgeting Section 5.1– Performance Measurement <p>Procedures: 12.PM-004 - <i>Project Scheduling</i> 12.PM-005 – <i>Cost Estimating</i></p>
Guideline 13: Establish overhead budgets for each significant organizational component of the company for expenses, which will become indirect costs. Reflect in the program budgets, at the appropriate level, the amounts in overhead pools that are planned to be allocated to the program as indirect costs.	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 4.2– Indirect Cost Planning and Control Section 4.4– Burdened Costs <p>Procedures: 12.PM-005 – <i>Cost Estimating</i></p>
Guideline 14: Identify management reserves and undistributed budget.	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 3.5- Cost Estimating and Baseline Budgeting Section 3.6– Management Reserve, Contingency, and Undistributed Budget Section 5.3- Performance Reporting <p>Procedures: 12.PM-005 – <i>Cost Estimating</i></p>
Guideline 15: Provide that the program target cost goal is reconciled with the sum of all internal program budgets and management reserves.	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 3.4- Planning and Baseline Scheduling Section 3.5-- Cost Estimating and Baseline Budgeting Section 3.6– Management Reserve, Contingency, and Undistributed Budget Section 5.3- Performance Reporting <p>Procedures: 12.PM-005 – <i>Cost Estimating</i></p>
Accounting Considerations	
Guideline 16: Record direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account.	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 4.1– Accounting Processes

EIA-748-C Guidelines	FRA Earned Value Management System (EVMS) Implementation
	<p>Procedures: Budget to Close Process Cycle Procure to Pay Process Cycle HR to Payroll Process Cycle Finance website: Policies & Procedures (CAS)</p>
<p>Guideline 17: 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.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> • Section 2.1- Work Breakdown Structure • Section 2.3- Organizational Responsibility • Section 4.1– Accounting Processes • Section 5.3- Performance Reporting <p>Procedures: 12.PM-002 – <i>Control Accounts, Work Packages, Planning Packages</i> 12.PM-006 – <i>Monthly Status Reporting</i></p> <p>Project/Task Structure Accounting Summary Reports Finance website: Policies & Procedures (CAS) Expenditure Type Glossary</p>
<p>Guideline 18: Summarize direct costs from the Control Accounts into the contractor’s organizational elements without allocation of a single Control Account to two or more organizational elements.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> • Section 2.1- Work Breakdown Structure • Section 2.23- Organizational Responsibility • Section 2.5- Responsibility Assignment Matrix • Section 4.1– Accounting Processes • Section 5.3- Performance Reporting <p>Procedures: 12.PM-002 – <i>Control Accounts, Work Packages, Planning Packages</i></p> <p>Project/Task Structure Accounting Summary Reports Finance website: Policies & Procedures (CAS) Expenditure Type Glossary</p>
<p>Guideline 19: Record all indirect costs, which will be allocated to the contract.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> • Section 2.1- Work Breakdown Structure • Section 4.1– Accounting Processes • Section 4.2- Indirect Cost Planning and Control <p>Procedures: 12.PM-005 – <i>Cost Estimating</i> 12.PM-006 – <i>Monthly Status Reporting</i> Finance website: Policies & Procedures (CAS & Indirect Methodology)</p>

EIA-748-C Guidelines	FRA Earned Value Management System (EVMS) Implementation
<p>Guideline 20: Identify unit costs, equivalent unit costs, or lot costs when needed.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 4.1– Accounting Processes
<p>Guideline 21: For EVMS, the material accounting system will provide for:</p> <ol style="list-style-type: none"> Accurate cost accumulation and assignment of costs to Control Accounts in a manner consistent with the budgets using recognized, acceptable, costing techniques. Cost performance measurement at the point in time most suitable for the category of material involved, but no earlier than the time of progress payments or actual receipt of material. Full accountability of all material purchased for the program including the residual inventory. 	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section - Cost Estimating and Baseline Budget Section 4.3- Material Accounting Section 5.3- Performance Reporting Section 4.1– Accounting Processes <p>Procedures:</p> <p>12.PM-005 – <i>Cost Estimating</i> 12.PM-006 – <i>Monthly Status Reporting</i></p> <p>Budget to Close Process Cycle Procure to Pay Process Cycle Finance website: Policies & Procedures (CAS)</p>
<p>Analysis and Management Reports</p>	
<p>Guideline 22: 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:</p> <ol style="list-style-type: none"> Comparison of the amount of planned budget and the amount of budget earned for work accomplished. This comparison provides the schedule variance. Comparison of the amount of the budget earned the actual (applied where appropriate) direct costs for the same work. This comparison provides the cost variance. 	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 5.1- Performance Measurement Section 5.2- Performance Analysis Section 5.3- Performance Reporting <p>Procedures:</p> <p>12.PM-006 – <i>Monthly Status Reporting</i></p>
<p>Guideline 23: Identify, at least monthly, the significant differences between both <u>planned</u> and <u>actual</u> schedule performance and <u>planned</u> and <u>actual</u> cost performance, and provide the</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> Section 5.1- Performance Measurement Section 5.2- Performance Analysis Section 5.3- Performance Reporting

EIA-748-C Guidelines	FRA Earned Value Management System (EVMS) Implementation
<p>reasons for the variances in the detail needed by program management.</p>	<p>Procedures: 12.PM-006 – <i>Monthly Status Reporting</i></p>
<p>Guideline 24: 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.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> • Section 3.5- Cost Estimating and Baseline Budget • Section 4.2- Indirect Cost Planning and Control • Section 5.1- Performance Measurement • Section 5.2- Performance Analysis • Section 5.3- Performance Reporting <p>Procedures: 12.PM-006 – <i>Monthly Status Reporting</i></p>
<p>Guideline 25: 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 contract.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> • Section 5.2- Performance Analysis • Section 5.3- Performance Reporting <p>Procedures: 12.PM-006 – <i>Monthly Status Reporting</i></p>
<p>Guideline 26: Implement managerial actions taken as the result of earned value information.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> • Section 5.3 - Performance Reporting <p>Procedures: 12.PM-006 – <i>Monthly Status and Reporting</i></p>
<p>Guideline 27: 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.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> • Section 5.2- Performance Analysis • Section 5.3- Performance Reporting <p>Procedures: 12.PM-005 – <i>Cost Estimating</i> 12.PM-006 – <i>Monthly Status Reporting</i></p>
<p>Revisions and Data Maintenance</p>	
<p>Guideline 28: 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 program organizations.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> • Section 3.6– Management Reserve, Contingency, and Undistributed Budget • Section 6 - Change Control Process <p>Procedures: 12.PM-006 – <i>Monthly Status Reporting</i> 12.PM-007 - <i>Change Control</i></p>

EIA-748-C Guidelines	FRA Earned Value Management System (EVMS) Implementation
<p>Guideline 29: Reconcile current budgets to prior budgets in terms of changes to the authorized work and internal re-planning in the detail needed by management for effective control.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> • Section 3.6– Management Reserve, Contingency, and Undistributed Budget • Section 3.7- Work Authorization • Section 5.3- Performance Reporting • Section 6- Change Control Process <p>Procedures: 12.PM-006 – <i>Monthly Status Reporting</i> 12.PM-007 - <i>Change Control</i></p>
<p>Guideline 30: Control retroactive changes to records pertaining to work performed that would change previously reported amounts for actual costs, earned value, or budgets. Adjustments should 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.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> • Section 3.6– Management Reserve, Contingency, and Undistributed Budget • Section 5.3- Performance Reporting • Section 6 - Change Control Process <p>Procedures: 12.PM-006 – <i>Monthly Status Reporting</i> 12.PM-007 - <i>Change Control</i></p>
<p>Guideline 31: Prevent revisions to the program budget except for authorized changes.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> • Section 6 - Change Control Process <p>Procedures: 12.PM-007 - <i>Change Control</i></p>
<p>Guideline 32: Document changes to the performance measurement baseline.</p>	<p>EVMS Systems Description Document –</p> <ul style="list-style-type: none"> • Section 6. - Change Control Process <p>Procedures: 12.PM-007 - <i>Change Control</i></p>

9. GLOSSARY

ABBREVIATIONS AND ACRONYMS

- ACWP** — Actual Cost of Work Performed
- AE** — Acquisition Executive
- A/E** — Architect/Engineer
- BAC** — Budget at Completion
- BCR** — Baseline Change Request
- BCWP** — Budgeted Cost of Work Performed
- BCWS** — Budgeted Cost of Work Scheduled
- BOE** — Basis of Estimate
- CA** — Control Account
- CAM** — Control Account Manager
- CASB** — Cost Accounting Standards Board Disclosure Statement
- CBB** — Contract Budget Baseline
- CD** — Critical Decision
- CDR** — Conceptual Design Report
- CFO** — Chief Financial Officer
- CO** — Contracting Officer
- CPR** — Cost Performance Report
- CV** — Cost Variance
- D&D** — Demolition and Decommissioning
- DOE** — U.S. Department of Energy
- EAC** — Estimate at Completion
- EIA** — Electronic Industries Alliance
- ES&H** — Environment, Safety, and Health
- ETC** — Estimate to Complete
- EVMS** — Earned Value Management System
- FFP** — Firm Fixed Price
- FRA** — Fermi Research Alliance
- FY** — Fiscal Year
- G&A** — General and Administration
- GAAP** — General Accepted Accounting Principles

IPR – Independent Project Review

IPT – Integrated Project Team

LOE – Level of Effort

MOU – Memorandum of Understanding

NEPA – National Environmental Policy Act

OBS – Organizational Breakdown Structure

ODC – Other Direct Costs

OPC – Other Project Costs

OPSS – Office of Project Support Services

PA – Oracle eBS Project Accounting

PB – Performance Baseline

PED – Project Engineering and Design

PEP – Project Execution Plan

PM – Project Manager

PMB – Performance Measurement Baseline

PMT – Performance Measurement Technique

PMP – Project Management Plan

RAM – Responsibility Assignment Matrix

RFP – Request for Proposal

RLS – Resource Loaded Schedule

SOW – Scope of Work

SV – Schedule Variance

TEC – Total Estimated Cost

TPC – Total Project Cost

UB – Undistributed Budget

UChicago – University of Chicago

URA – Universities Research Association

VAR – Variance Analysis Report

WBS – Work Breakdown Structure

TERMS AND DEFINITIONS

Term	Definition
Accrual Method	An accounting method in which: revenue is recognized when earned rather than when collected; expenses are recognized when incurred rather than when paid. Accrual-basis accounting is essential to accurate performance and progress information on contracts.
Acquisition Executive (AE)	The individual designated by the Secretary of Energy to integrate and unify the management system for a program portfolio of projects and implement prescribed policies and practices.
Acquisition Strategy	An acquisition strategy is a high-level business and technical management approach designed to achieve project objectives within specified resource constraints. It is the framework for planning, organizing, staffing, controlling, and leading a project. It provides a master schedule for activities essential to project success, and for formulating functional strategies and plans.
Authorized Unpriced Work	Any change to the contract statement of work that has been authorized by the customer and is being worked on, but for which no price has yet been negotiated.
Baseline Change Request (BCR)	The documentation that describes a change in scope, cost, or schedule. BCRs are initiated as a request to the Project Manager, and ultimately resulting in approval or disapproval, with associated appropriate implementation into the PMB.
Budget at Completion (BAC)	The total authorized budget for accomplishing the scope of work. It is equal to the sum of all allocated budgets plus any undistributed budget. (Contingency is not included.) The Budget at Completion will form the Performance Baseline.
Budgeting	The process of translating resource requirements into a funding profile.
Change Order	A bilateral or sometimes unilateral order signed by the government contracting officer that directs the contractor to make a change that the change clause authorizes, usually with but sometimes without, the contractor's consent.
Collaborator	A university or laboratory partner who participates in a project by providing labor and/or materials through direct funding from the project, or through in-kind contributions.
Conceptual Design	The concept for meeting a mission need. The conceptual design process requires a mission need as an input. Concepts for meeting the need are explored and alternatives considered to determine a set of alternatives that are technically viable, affordable, and sustainable.

Term	Definition
Configuration Management	The control, documentation, and reporting of changes to data sets, technical specifications, reports, and documents.
Contingency	The budget identified by the customer and the project, for managing known and unknown risks. The release of this budget is controlled by the customer and managed through the change control process by approval thresholds defined in the PEP and PMP. Contingency is not part of the Performance Measurement Baseline.
Contract	A contract is a mutually binding agreement that obligates the seller to provide the specified product and obligates the buyer to pay for it.
Contractor	An individual, partnership, company, corporation, or association having a contract with a contracting agency for the design, development, maintenance, modification, or supply of deliverable items and/or services under the terms of a contract.
Control Account	A key management control point located at the natural intersection point of the WBS and the OBS, where functional responsibility for work is assigned. It represents the point at which budgets (resource plans) and actual costs are accumulated and compared to the earned value for management control purposes.
Control Account Manager (CAM)	The member of the project team responsible for the performance defined in a Control Account and for managing the resources authorized to accomplish the tasks
Cost Estimate	A documented statement of costs estimated to be incurred to complete the project or a defined portion of the project.
Cost Variance	The difference between Earned Value and Actual Cost ($CV = BCWP - ACWP$). A positive value indicates a favorable condition, and a negative value indicates an unfavorable condition.
Cost Performance Index (CPI)	The ratio of earned value to actual costs ($CPI = BCWP / ACWP$); a value greater than one denotes favorable performance. CPI is often used to predict the magnitude of possible cost deviations from the baseline.
Critical Decision (CD)	On DOE projects, a formal determination made by the Acquisition Executive and/or designated official at a specific point in a project life cycle that allows the project to proceed. Critical Decisions occur during a project: at the determination of Mission Need (CD-0), at the completion of conceptual design (CD-1), at project baselining (CD-2), at the commencement of execution (CD-3), and at turnover (CD-4).

Term	Definition
Critical Path	In a project network diagram, the series of logically linked activities that determine the earliest completion date for the project. Generally, it is the longest path through the project. However, a critical path can end, as an example, on a schedule milestone that is in the middle of the project schedule and that has a finish-no-later than imposed date schedule constraint.
Critical Path Method (CPM)	A network analysis technique is used to determine the amount of scheduling flexibility (the amount of float) on various logical network paths in the project schedule network, and to determine the minimum total project duration. Early start and finish dates are calculated by means of a forward pass, using a specified start date. Late start and finish dates are calculated by means of a backward pass, starting from a specified completion date, which sometimes is the project early finish date determined during the forward pass calculation.
Deviation	A deviation occurs when the current estimate of performance, technical, scope, schedule, or cost parameter is not within the threshold values of the Performance Baseline for that parameter. It is handled as a deviation, not through the normal change control process.
Directed Change	A change imposed on a project(s) that affects the project's baseline. An example of directed changes includes, but are not limited to, (1) changes to approved budgets or funding and (2) changes resulting from DOE policy directives and regulatory or statutory requirements.
Duration	The number of work periods (not including holidays or other nonworking periods) required to complete an activity or another project element, and usually expressed as workdays or workweeks.
Estimate at Completion (EAC)	The latest revised cost estimate for a given work scope
Estimate to Complete (ETC)	Estimate of costs to complete all work from a point in time to the end of the project.
Estimated Cost	An anticipated cost for an applied work scope.

Term	Definition
Firm Fixed Price Contract	Fixed price contracts provide for a firm price or, under appropriate circumstances, may provide for an adjustable price for the supplies or services that are being procured. In providing for an adjustable price, the contract may fix a ceiling price, target price (including target cost), or minimum price. Unless otherwise provided in the contract, any such ceiling, target, or minimum price is subject to adjustment only if required by the operation of any contract clause that provides for equitable adjustment, escalation, or other revision of the contract price upon the occurrence of an event or contingency.
Indirect Costs	Costs that cannot be attributed or assigned to a system as a direct cost and may also be referred to as burden or overhead.
Integrated Project Team (IPT)	An IPT is a cross-functional group of individuals organized for the specific purpose of delivering a project to an external or internal customer.
Level of Effort (LOE)	The effort of a general or supportive nature without a deliverable product; an activity that does not lend itself to the measurement of discrete accomplishment. It is generally characterized by a uniform rate of activity over a specific period. Value is earned at the rate that the effort is being expended.
Management Reserve	The portion of the project budget allocated by the customer and under the authority of the project for management control purposes rather than being designated for the accomplishment of specific tasks. The customer will determine whether it will be used on each project and, if so, its purpose may also be pre-defined by the customer. It is not part of the Performance Measurement Baseline (PMB). The release of this budget is managed as part of the total contingency through the change control process and determined by approval thresholds defined in the PEP and PMP.
Memorandum of Understanding (MOU)	A bilateral agreement between the project manager and a collaborating institution to perform a specific scope of work for a project. The Statement of Work (SOW) that is part of the MOU details the scope, cost, and schedule. MOUs may span an entire project, but SOWs are prepared for each fiscal year. MOUs may be executed as purchase orders or other agreements such as Interentity Work Orders (IWOs).
Milestone	A scheduled event marking the due date for accomplishment of a specified effort (work scope) or objective. A milestone may mark the start, an interim step, or the end of one or more activities.

Term	Definition
Network Schedule	A schedule format in which the activities and milestones are represented along with the interdependencies between activities. It expresses the logic (how the program will be accomplished) and the time frames (when). Network schedules are the basis for critical-path analysis, a method for identification and assessment of schedule priorities and impacts.
Office of Project Support Services (OPSS)	The organization within Fermilab with the responsibility and authority for Director’s Policy 12 (Project Management). The office has the responsibility to support the management of projects >\$5M, conduct Director’s Reviews and creates and maintain project management-related procedures.
Organizational Breakdown Structure (OBS)	A depiction of the project organization arranged to indicate the line-reporting relationships within the project context.
Other Project Costs (OPC)	Costs for engineering, design, development, startup, and operations, which are essential for project execution and are operating-expense funds.
Performance Measurement Baseline (PMB)	The collected key performance, scope, cost, and schedule parameters. The Performance Measurement Baseline defines the threshold and boundary conditions for a project. The PMB is modified in accordance with the change control process.
Performance Measurement Technique (PMT)	A defined method of earning value in relation to the resources expended. Also known as Earned Value Methodology.
Planning Package	A logical aggregate of work, usually future efforts that can be identified and budgeted, but which is not yet planned in detail at the work package or task level.
Program Office	The DOE headquarters organizational element responsible for managing a program.
Project	In general, a unique effort that supports a program mission; has defined start and end points; is undertaken to create a product, facility, or system; and contains interdependent activities planned to meet a common objective or mission. A project is not constrained to any specific element of the budget structure (e.g., operating expense or plant and capital equipment). Construction, if required, is part of the total project. Projects include planning and execution of construction, renovation, modification, environmental restoration, decontamination and decommissioning efforts, and large capital equipment or technology development activities. Tasks that do not include the above elements, such as basic research, grants, ordinary repairs, maintenance of facilities, and operations, are not considered projects.

Term	Definition
Project Controls	Project support staff for planning, baseline development, management system plan preparation, as well as for monitoring, assessing, controlling, and reporting progress against the project baseline.
Project Execution Plan (PEP)	The plan for the execution of the project, which establishes roles and responsibilities and defines how the project will be executed. Every project implementing Earned Value management will have a unique project execution plan.
Project Financial staff	Project support staff for preparing cost information for monthly reports, monitoring expenditures, tracking spending deviations from baseline plans, preparing the Project Accounting task structure, tracking requisitions, and developing interfaces for financial information from external entities such as other laboratories and universities.
Project Management Plan (PMP)	The project-specific plan that outlines how projects will manage components such as risk, quality, interfaces, resources, and configuration control.
Remaining Duration	The time needed to complete an activity.
Responsibility Assignment Matrix (RAM)	A structure that relates the project organization structure to the work breakdown structure to help ensure that each element of the project's scope of work is assigned to a responsible individual.
Risk	A measure of the potential inability to achieve overall project objectives within defined cost, schedule, and technical constraints, and has two components: (1) the probability/likelihood of failing to achieve an outcome, and (2) the consequences/impacts of failing to achieve that outcome.
Risk Management	The act or practice of controlling risk. An organized process that reduces risk, prevents a risk from occurring, or mitigates the impact if it does occur.
Schedule	A plan that defines when specified work is to be done to accomplish program objectives on time.
Schedule Control	Controlling changes to the project schedule and preparing workaround plans to mitigate the impact of adverse results/delays by others.
Schedule Performance Index (SPI)	A schedule performance indicator correlating work accomplished to the planned schedule (BCWP/BCWS). A value greater than one denotes favorable performance.

Term	Definition
Schedule Variance (SV)	A metric for the schedule performance on a program. It is the algebraic difference between Earned Value and the Budget (Schedule Variance = BCWP – BCWS). A positive value is a favorable condition while a negative value is unfavorable. The SV is calculated in dollars or work units and is intended to complement network analysis, not to supersede or replace it.
Scope of Work (SOW)	The document that defines the work scope requirements for a project. It is a basic element of control used in the processes of work assignment (scope) and the establishment of project schedules and budgets.
System	A collection of interdependent equipment and procedures assembled and integrated to perform a well-defined purpose. It is an assembly of procedures, processes, methods, routines, or techniques united by some form of regulated interaction to form an organized whole.
Total Estimated Costs (TEC)	The Total Estimated Cost of a project is the specific cost of the project, whether funded as an operating expense or construction. It includes the cost of land and land rights; engineering, design, and inspection costs; direct and indirect construction costs; and the cost of initial equipment necessary to place the plant or installation in operation, whether funded as an operating expense or construction.
Uncosted Labor	Labor accounted for in work package estimates, but at a \$0 rate in the budget. Such a rate may be used for scientific effort at the customer's direction.
Undistributed Budget (UB)	Budget associated with specific work scope or contract changes that have not been assigned to a control account.
Work Breakdown Structure (WBS)	A product-oriented grouping of project elements that organizes and defines the total scope of the project. The WBS is a multilevel framework that organizes and graphically displays elements representing work to be accomplished in logical relationships. Each descending level represents an increasingly detailed definition of a project component. Project components may be products or services. It is the structure and code that integrates and relates all project work (technical, schedule, and cost) and is used throughout the life cycle of a project to identify and track specific work scopes.
Work Breakdown Structure Dictionary	A listing of work breakdown structure elements with a short description of the work-scope content in each element.
Work Package	A task or set of tasks performed within a control account. The work package is the lowest level activity to which resources are assigned.