

FACILITIES MAINTENANCE AND ENGINEERING PROCEDURE		
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1.0 PURPOSE

To establish the standards for Facilities Maintenance and Engineering (FME) that are to be used to develop and maintain cost and schedule plans, collect costs, forecast future requirements and to measure and report performance. Implementing procedures for these processes are contained in the following Project Controls Procedures:

FMEP-G-00120	FME Trend Program
FMEP-G-00130	FME Estimating Procedure
FMEP-G-00140	Scheduling
FMEP-G-00160	Work Order Processing
FMEP-G-00170	Progress Measurement and Reporting
FMEP-G-00180	Assignment of Risk and Contingency

2.0 GENERAL

This procedure shall be implemented for the Facilities Maintenance and Engineering for the establishment and maintenance of the project baseline, the collection of actual costs against the baseline, the forecasting of the project completion schedule and costs and the measurement and reporting of progress.

2.1 Definitions

Actual Costs – The direct costs incurred to date by SAIC in Smart Stream and posted in PMCS as of the end of the performance period.

Approved Modifications - Changes to approved subcontract scope of work, cost and schedule. Modifications are considered to be pending until signed by the SAIC Contracting Officer and NCI Contracting Officer where required.

Baseline - A quantitative expression of the projected technical, schedule, and cost base, or the standard for measurement during the performance of an effort; the established plan against which the status of resources, tasks and the objectives of a project can be measured.

Baseline Budget – The project estimate developed at either Conceptual Authorization or Fiscal Authorization is used as the basis or measuring cost performance. The baseline budget is only changed through approved trends for user requested changes, unforeseen conditions, market conditions and use of contingency.

Baseline Schedule – The beneficial occupancy date is negotiated with the customer and is used as the basis of measuring schedule performance. The baseline schedule can only be changed through approved trends resulting from user requested changes, unforeseen conditions, and market conditions.

Beneficial Occupancy - The milestone for occupancy by the facility user. This milestone is determined based on the user requirements and when the facility may be safely occupied.

Budget At Completion (BAC) - The sum of the baseline budgets including approved trends.

Center Number – The charge number at which the programs budget and collect costs.

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Computerized Maintenance System (CMS) – the system used by FME to track the scope, estimates and actual hour and material costs for Work Orders. The system also provides the actual hours and material costs to the Accounting System.

Conceptual Approval – If a work order requires design, a conceptual approval package consisting of a scope of work and a Conceptual Approval estimate is prepared and submitted to NCI. The approval by NCI authorizes FME initiate the project within the bounds of the estimate.

Conceptual Estimate – The estimate that is submitted to the NCI for Conceptual Approval to proceed with the project. Detailed engineering or studies may be required to further develop the scope of work and assumptions upon which the CA estimate is based. These studies provide a basis for assessing the magnitude of risk and associated contingency. Scope definition and design should be sufficient to restrict project contingency to no more than 10%.

Construction Phase - The construction period from the start of construction up to substantial completion.

Construction Substantial Completion - The milestone for when construction is essentially complete and only punch list items and acceptance testing remain to be performed.

Current Baseline – The Baseline scope, cost, and schedule as established at Conceptual Approval or Fiscal Approval and modified only by approved trends.

Current Schedule - The schedule that is maintained to reflect the current progress, the forecasted remaining durations and alternative paths used to complete the work. This schedule is compared to the Baseline Schedule to determine performance against project end dates.

Design Phase - The design period from the start of detailed design through the completion of the 100%. This does not include the design support during construction and acceptance testing.

Estimate at Completion (EAC) -The sum of the actual costs to date plus the Estimate to Complete for the scope of work identified in the Budget at Completion.

Estimate to Complete (ETC) - The estimate of the hours and/or dollars required to complete the remaining work scope.

Fiscal Approval - The Approval by NCI to proceed with the demolition, renovation or construction of a project. The package usually includes a Scope of Work, design at 95% complete and a detailed construction estimate. In cases where the work must commence before the design is complete, the Fiscal Approval package will be submitted with an estimate based on the Scope of Work and Design that has been completed at that time. An estimate allowance based on the incomplete design will be included in the estimate.

Fiscal Approval Estimate – The estimate submitted with the Fiscal Approval package that is generally based on quantities from design drawings that are 95% complete and actual plus forecasted costs for Design engineering.

Omissions - Items that were omitted from the Scope of Work, contract or design that should have been included.

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Preliminary Planning Estimate – A very summary estimate used to provide an indication of the costs expected based on historical data, costs per square foot or other similar metrics. Potential applications for this type of estimate include determining the “Go” or “No Go” status of the work order, identification of a project as a potential Repair and Improvement project, or a preliminary budgeting tool. The accuracy of the estimate, due to lack of detailed engineering or studies, is not sufficient to establish a basis for funding estimate nor a basis for measurement of performance.

Project Team – Each project has a dedicated team responsible for execution of projects and communication between FME and the NCI.

Scope of Work - The document that defines the technical requirements as well as any special assumptions or exclusions of the project and is the basis of the design, estimate and schedule. Any changes on the Scope of Work should be evaluated for impacts to the cost and schedule and documented via the trend process.

Subcontract Modifications – Changes to the baseline Scope of Work, cost or schedule. This includes change requests to FME and program scope and change orders to the A&E, construction subcontracts or equipment purchase orders. Subcontract and purchase order change orders are considered pending until signed by the SAIC Contracting Officer and NCI Contracting Officer, where applicable.

Total Cost to Date - The cost incurred and recorded in the accounting system (Smart Stream) for the project.

Trend – Documents identifying a change to the current approved scope of work, cost, and schedule baselines of a Work Order. There are two types of trends, scope change and non-scope change. A scope change trend is a change resulting from user requested changes, market conditions, or unforeseen conditions that increase or decrease the current cost, or schedule, or technical requirements of the work order. Approval of a scope change trend will modify the authorized budget. A non-scope change trend is a change that is an increase or decrease to the expected Estimate at Completion (EAC) attributed to an error or omission, incorrect assumptions or conditions; however approval does not change the baseline cost, schedule, or technical requirements of the work order.

Unforeseen Conditions - Acts of nature or the discovery that existing conditions of a facility were not known prior to the award of the contract or the start of the work.

User Requested Changes - Requests for changes outside the approved Scope of Work, contract or design document identified as being required by the individuals who are or will be tenants of the facility being renovated or constructed.

Work Breakdown Structure (WBS) – the logical grouping of work used as a common base for all project planning, scheduling, cost accumulation, and reporting of progress during the duration of the project.

Work Order Complete – The milestone indicating closure of the Work Order in CMS

Work Order Closed - The milestone indicating completion of the final cost analysis and official closure of the Work Order.

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Work Order Request (WO) – The form prepared by the programs/users requesting maintenance or renovation tasks to be completed by FME.

2.2 Responsibilities

The Manager of Engineering is responsible for the design of new construction and all facility changes to the NCI-Frederick facilities.

The Manager, Operations and Maintenance (M&O) is responsible for providing the materials and labor required for the completion of the construction activities or renovation work assigned to Operations and Maintenance.

Project Manager is responsible for the management of the projects including coordinating of the design and construction activities, interfacing with the customer and the NCI and assuring that the project is completed on time and with in budget.

The Manager, Project Controls (PC) is responsible for controlling the estimating, cost, and schedules of all major projects and renovations for FME. The Manager, Project Controls establishes a cost and schedule performance monitoring system, tracks and coordinates Work Orders, maintains the “Computerized Maintenance System (CMS)”, and the “Project Management Control System (PMCS)” systems, setting the estimating, cost and schedule standards, and maintains the change control process and supporting progress reporting.

3.0 PROCEDURE

3.1 Work Breakdown Structure

The Work Breakdown Structure (WBS) is used to systematically organize FME work into logical groupings of work and its subdivisions. The WBS is used as a common base for all project planning, scheduling, cost accumulation, and reporting of performance during the entire period of the program.

3.1.1 WBS for FME Organization

<u>WBS Level</u>	<u>WBS Description</u>	<u>Example</u>
Level 1	Program	FME
Level 2	Directorate	BS
Level 3	Sub-Directorate	CCR
Level 4	Work Order	118881
Level 5	Phase	Design
Level 6	Sub-Phase	30% Design

3.2 Overall Process

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Work in FME is tracked and managed using Work Orders (WO). The customers request work to be performed on their equipment or facilities using the Work Order Request Form. Upon receipt of the WO, Project Controls enters the base information into the Project Management Control System (PMCS). The PMCS is a collection of integrated processes and tools used to manage and report work orders. These tools (which are described in detail within applicable Project Controls procedures) consist of:

- Computerized Maintenance System (CMS)
- Project Management & Control System (PMCS) database
- Primavera Project Planner (P3) – Commercially available scheduling software

On a weekly basis a Work Order Review Meeting (WORM) is held to review work orders that were received in the previous week. A team of FME employees including the Manager of O&M, Manager of Project Management and Construction, Project Controls and Project Managers evaluates the engineering requirements and sends the work orders either to Engineering or to Operations and Maintenance (O&M) organizations for completion.

In order to facilitate work execution and monitoring, work orders are categorized as “Planned Work Orders” or “Unplanned Work Orders”:

- Planned Work Orders meet one of the following criteria:
 - Estimated costs greater than \$5,000.
 - Requires Engineering Design.
- Unplanned Work Orders include Trouble Calls and Special Assist Work Orders:
 - A Trouble Call requires immediate attention by FME to correct a problem. Trouble calls are typically routine requests that require less than 2 job hours to resolve.
 - Special Assist Work Orders are those that do not have the urgency of a Trouble Call and have an estimated cost of less than \$5,000. These are typical, routine work processes such as installation of shelving, refrigerators, freezers, etc. This work is expedited by eliminating the requirement to develop and obtain approval of a detailed estimate.

Depending on the type of work order, varying components of project controls processes are applicable. These variations are addressed within each of the implementing procedures detailed below.

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3.3 Trend Program

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Change control is to be used to maintain the project cost, schedule and technical baseline. Technical and Cost Change control will start upon NCI's approval of the Conceptual or Fiscal estimates. Milestone change control starts with the negotiation of the beneficial occupancy dated and incorporation of the work order construction activity into the approved Construction Summary Schedule.

Project Controls procedure FMEP-G-0120, "Trend Program" describes the Trend Program processes.

3.4 FME Estimating Procedure

Cost estimating is an integral piece of the baseline development process. Cost estimates provide the basis for the baseline budget against which actual cost and progress will be compared. The cost estimate represents estimated units and dollars required to accomplish the work effort. The cost estimate is supported by documentation that identifies the assumptions, rationale, and basis for the estimate.

Project Controls procedure FMEP-G-0130 – "Cost Estimating" describes the processes for developing cost estimates including:

- Preliminary Planning Estimates
- Conceptual Estimates
- Fiscal Estimates

3.5 Scheduling

Schedules incorporate milestones, key decision points, schedule constraints, logical relationships, and interdependencies. Schedule templates based on the acquisition strategy, size and complexity of the job are used to formulate an initial planning schedule. Upon project team consensus of beneficial occupancy or major deliverable dates, the project is added to the Construction Summary Schedule. These milestones are used to measure progress.

Project Controls procedure FMEP-G-0140, "Scheduling", describes the processes for developing schedules.

3.6 Progress Measurement and Reporting

The baselines generated during the planning and budgeting phase are statused for progress and technical accomplishment and then compared to actual costs. Estimates To Complete (ETC) are updated and corrective actions are initiated where problems exist.

A. Performance Measurement Process- The performance measurement process begins with evaluating the amount of work accomplished in terms of percent complete or interim milestones. Earned value is then calculated against the baseline. Earned value represents in budget dollars the value of work actually accomplished. It is determined by multiplying the current budget by the percent complete of the work order. The statusing of and calculation of earned value occurs monthly. Results are incorporated into management reports for review and analysis of cost and schedule performance and for implementation of corrective actions. This process is required for jobs of significant size and/or complexity, generally greater than \$1M.

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B. Performance Analysis and Forecasting- Early detection and correction of performance-related problems are benefits of a properly implemented Change Management System also called the Trend Program. It is important to recognize potential problems while time and resources are available to correct the problem and to minimize the impact on other work elements. Performance analysis focuses management's attention on critical project issues. The Project Manager provides management with an explanation of the problem, evaluation of the impact of the variance, and suggested corrective actions. This process is required for all projects regardless of size or complexity.

In addition to evaluating progress to date, a monthly assessment is made of cost and schedule resources required to complete a project. This assessment results in a current estimate to complete for each work scope. Each month Project Managers review the estimate to complete for each work order. Analysis of current forecasts provides the Project Manager a vision of where the project may be headed early enough to implement necessary corrective action. This process is required for all projects regardless of size or complexity.

Project Controls procedure FMEP-G-0170, "Progress Measurement and Reporting", describes the processes for progress reporting.

3.7 Assignment of Risk and Contingency

Identifying risk, assessing its severity, and selecting and managing options for resolving those risks provides a structure for establishing cost provisions, held by the project team, to mitigate probable technical, cost, contract, and schedule risks associated with project execution. The purpose of this procedure is to ensure consistency in the development of contingency reserves for the mitigation of risk.

Project Controls procedure FMEP-G-0180, "Assignment of Risk and Contingency", describes the Quantitative Risk Assessment and Management process used to support assignment of contingency levels.
