PROGRAM AND PROJECT MANAGEMENT FOR FACILITIES AND ENGINEERING SERVICES (Formerly: PROJECT CONTROL SYSTEM PROCEDURES)

1.0 APPROVAL RECORD

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Approved by: Chief Operations Officer (Mark Murphy)

The official approval record for this document is maintained in the Training and Documents Office, 105 TASF.

2.0 REVISION/REVIEW LOG

This plan has been updated by a new author. Future revision descriptions for this document will be made available from and maintained by the author.

3.0 PURPOSE AND SCOPE

To provide Ames Laboratory personnel with program and project management direction for the execution of facilities and engineering services projects. The goal is to deliver each project within planned scope, cost, and schedule. Projects should be fully capable of meeting mission performance, safeguards and security, and environmental, safety, and health requirements.

For projects that have a total project cost (TPC) under $10 million, Ames Laboratory will use a tailored approach and follow the guiding principles in DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets.* For projects with a TPC over $10 million, Ames Laboratory will comply with the requirements of DOE Order 413.3B.

4.0 ROLES AND RESPONSIBILITIES

The primary responsibility for the program and project management rests with the Facilities and Engineering Services (FES) department.

Manager, Facilities and Engineering Services (FES): Responsible for overall operations and maintenance of existing DOE facilities at the Ames Laboratory. The Manager is responsible for departmental safety, personnel management, budget management, long-range planning, and policy/procedure management. This individual also serves as the program manager.

Assistant Manager, Facilities and Engineering Services (FES): Assists the FES Manager with the overall management of the department. Administers and directs all activities for engineering services. The Assistant Manager is responsible for mechanical design activities, and oversight of the electronics shop and machine shop. Performs lab-wide duties as the Chairman of the Fire Safety Committee, member of the Safety Review Committee, and is the Laboratory's Emergency Management Coordinator. This individual also serves as a project manager for assigned projects.

Plant Engineer: Responsible for the technical aspects of the operations and maintenance of existing facilities and future facility expansions. Ensures the Laboratory's physical plant is in proper working order and is called upon to troubleshoot any malfunctions. Performs duties as the FES Safety Coordinator, voice communications coordinator, and is a member of the Emergency Response Team. This individual also serves as a project manager for assigned projects.

Facilities Engineer: Responsible for planning, executing, and closing projects. The Facilities Engineer serves as a project manager for assigned projects.

Engineering Technician: Manages the automated systems supporting operations and maintenance of Laboratory facilities, and the design and fabrication of research devices. Compiles, reports, and validates all information in DOE's Facilities Information Management System (FIMS). The Engineering Technician oversees the Condition Assessments Surveys (CAS) program and Preventive Maintenance (PM) program. This individual also serves as a project manager for assigned projects.

Manager, Facilities Maintenance: Responsible for implementation and supervision of the maintenance management program. Responsible for safety, supervision, and management of the craft shop personnel. This individual also serves as a project manager for assigned projects.

Facilities Mechanics/Engineering Machinists: Responsible for performing maintenance and repair tasks and mechanical machining tasks. Comply with established readiness review procedures, and follow safety rules. Responsible for constantly assessing their work environment for potential safety hazards and taking appropriate actions to eliminate or control any hazards encountered.

Secretary, Facilities and Engineering Services (FES): Receives facilities trouble calls, creates work orders, and routes them to appropriate personnel for action. Reviews, processes and tracks work orders and departmental timesheets. Reviews and tracks departmental purchase card transactions. This individual also creates project folders both in hard-copy and digitally at the beginning of a project and maintains files of completed projects.

5.0 PERFORMANCE

Ames Laboratory will develop Project Execution Plans (PEP) by considering risk, complexity, visibility, cost, safety, security, and schedule for each project it undertakes. Projects at Ames Laboratory fall into one of three categories: Operating Projects, General Plant Projects (GPP), or Line Item Projects. For Operating Projects and GPP Ames Laboratory will follow the guiding principles of DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets.* For Line Item Projects (TPC >$10 million), Ames Laboratory will comply with the requirements in DOE Order 413.3B.

5.1 Project Planning

5.1.1 Operating Projects

Overhead expensed projects, research program projects & Strategic Partnership Projects (SPP). FES develops the project list for overhead expensed projects and submits the highest priority projects in the annual overhead budget request. Overhead expensed projects must be authorized by the Ames Laboratory Budget Officer and the

Chief Operations Officer before project execution can start. Projects not approved for the current overhead budget year are placed on a backlog list for consideration in future years. Research program and SPP project requests are generated by the customer and submitted to FES for planning and estimating. If approved ~~to move forward~~ by Laboratory management and the customer, FES executes the project.

5.1.2 General Plant Projects

General Plant Projects are developed through the annual Mission Readiness process and Laboratory Plan preparation. Project Data Sheets (PDS) are prepared for each project. The projects are prioritized in accordance with the Facilities and Infrastructure Project Prioritization Plan. The highest priority projects are inserted into the Ten-Year-Site-Plan (TYSP) for review by DOE on an annual basis. A Construction Directive Authorization (CDA) must be issued by the Ames Site Office (AMSO), and a Service Order Requisition (SOR) must be approved by the Ames Laboratory Budget Officer before GPP project execution can start.

5.1.3 Line Item Projects (TPC >$10 million)

Line Item projects are developed through the annual Mission Readiness process and Laboratory Plan preparation. Project Data Sheets (PDS) are prepared for each project. The projects are prioritized in accordance with Ames Laboratory Plan 46300.010 Facilities and Infrastructure Project Prioritization. The projects are inserted into the Ten-Year-Site-Plan (TYSP) for review by DOE. Approved Line Item projects are then submitted to DOE with the budget request for the Fiscal Year (FY) that they are planned for. Line Item projects must be managed in accordance with DOE Order 413.3B.

5.2 Project Phases

The terminology for executing projects is defined in DOE Order 413.3B. Although only required for Line Item Projects, Ames Laboratory has adopted the DOE terminology for Operating Expensed Projects and GPP as well. Projects have six primary phases, which include five Critical Decision (CD) phases and a Project Closeout phase.

5.2.1 CD-0, Approval of Mission Need

The initiation phase begins with the identification of a mission-related need. A program will identify a credible performance gap between its current capabilities ~~and capacities~~ and those required to achieve the goals articulated in its strategic plan. The Mission Need Statement (MNS) is the translation of this gap into functional requirements that cannot be met through other than material means. It should describe the general parameters of the solution and why it is critical to the overall accomplishment of the mission, including the benefits to be realized. The mission need is independent of a particular solution, and should not be defined by equipment, facility, technological solution, or physical end-item. This approach allows the Laboratory management flexibility to explore a variety of solutions and not limit potential solutions. The cost range provided at CD-0 should be Rough-Order of Magnitude (ROM) and is used to determine the project type and level of approval authority needed. It does not represent the PB, which will be established at CD-2.

5.2.2 CD-1, Approval of Alternative Selection and Cost Range

CD-1 approval marks the completion of the project definition phase and the conceptual design. This is an iterative process to define, analyze, and refine project concepts and alternatives. This process uses a systems engineering methodology that integrates requirements analysis, risk identification and analysis, acquisition strategies, and concept exploration in order to evolve a cost-effective, preferred solution to meet a mission need. The recommended alternative should provide the essential functions and capabilities at an optimum life-cycle cost, consistent with required cost, scope, schedule, performance, and risk considerations. It should be reflected in the site's long-range planning documents as well. Approval of CD-1 provides the authorization to begin the project execution phase and allows Project Engineering and Design (PED) funds to be used.

5.2.3 CD-2, Approval of Performance Baseline

Completion of the preliminary design is the first major milestone in the project execution phase. The design must be sufficiently mature at the time of CD-2 approval to provide reasonable assurance that the design will be feasible within the approved Performance Baseline (PB). Approval documentation at CD-2 must clearly specify the project's approved PB, which includes the TPC, CD-4 date (month and year), scope and minimum Key Performance Parameters (KPPs) that must be achieved at CD-4.

5.2.4 CD-3, Approval of Start of Construction

CD-3 is a continuation of the execution phase. With CD-3 approval, a project can move forward with all construction, implementation, procurement, fabrication, acceptance and turnover activities.

5.2.5 CD-4, Approval of Start of Operations or Project Completion

CD-4 is the approval of transition to operations, and it marks the completion of the execution phase. The approval of CD-4 is predicated on the readiness to operate and/or maintain the system, facility, or capability. Transition and turnover does not necessarily terminate all project activity. In some cases, it marks a point known as Beneficial Occupancy Date (BOD) at which the operations organizations assume responsibility for starting operations and maintenance. Laboratory management approves CD-4 upon notification from the project team that all project completion criteria defined in the PEP have been met. Documents approving CD-4 must clearly specify the scope accomplished, the TPC, KPPs met, and the completion date (month and year) as it relates to the original CD-2 performance baseline and latest approved baseline change.

5.2.6 Project Closeout

After the project is complete, the final step is project closeout. Project closeout provides a determination of the overall closure status of the project, contracts, regulatory drivers, and fiscal condition.

5.3 Project Management Principles

A project is a unique effort having defined start and end points which is undertaken to create a product, facility or system. Built on interdependent activities that are planned to meet a common objective, a project focuses on attaining or completing a deliverable within a predetermined cost, schedule and technical scope baseline. DOE' s framework for successful project execution are:

- Line management accountability
- Sound, disciplined, up-front project planning
- Well-defined and documented project requirements
- Development and implementation of sound acquisition strategies that incorporate effective risk handling mechanisms
- Well-defined and managed project scope and risk-based Performance Baselines (PBs), and stable funding profiles that support original cost baseline execution
- Development of reliable and accurate cost estimates using appropriate cost methodologies and databases
- Properly resourced and appropriately skilled project staff
- Effective implementation of all management systems supporting the project (e.g., quality assurance, integrated safety management, risk management, change control, performance management and contract management)
- Early integration of safety into the design process
- Effective communication among all project stakeholders
- Utilization of peer reviews throughout the life of a project to appropriately assess and make course corrections
- Process to achieve operational readiness is defined early in the project for Hazard Category 1, 2, and 3 nuclear facilities (not applicable to Ames Laboratory)

5.4 Acquisition Strategy

An acquisition strategy is a key activity formulated by the Integrated Project Team (IPT) leading up to CD-1. It is the Laboratory's overall plan for satisfying the mission need in the most effective, economical and timely manner.

5.5 Baseline Clarity

There is only one original Performance Baseline (PB) and it is documented at CD-2 approval. The PB represents the Laboratory's commitment to DOE to deliver the project's defined scope by a particular date at a specific cost. Cost estimates in advance of CD-2 do not represent such commitments. Also, there should be clarity over the terms PB and Performance Measurement Baseline (PMB) as they are different. The former is the project's baseline and the latter is for use by the Earned Value Management System (EVMS).

5.6 Design Maturity

All aspects of a project should be carefully studied to employ an economic and functional design that is closely tailored to the requirements. Particular attention shall be directed to advancing design maturity to a sufficient level prior to establishing the PB. The project design will be considered sufficiently mature when the project has developed a cost estimate and all relevant organizations have a high degree of confidence that it will

endure to project completion. In determining the sufficiency of the design level, factors such as project size, duration and complexity will be considered. Project design is a process of preparing design and construction documents that result in fully integrated solutions. For a design to succeed, the entire project team must be involved in the process from project inception through delivery.

5.6.1 Pre-Conceptual Design

Pre-conceptual design denotes the development and documentation of the functional parameters or capabilities that the potential project must meet. The development of criteria, which are complete and specifically related to the project requirements, allows for orderly development of the design. However, care shall be taken to avoid citing superfluous codes and standards; the primary purpose of functional criteria is to narrow the criteria to only those applicable to specific alternatives or options. These functional criteria are further developed, validated, and expanded during the conceptual design stage.

5.6.2 Conceptual Design

Must ensure that a solution or alternatives are not only responsive to an approved need, but also technically achievable, affordable and will provide the best value to the Laboratory. Research, development, testing and other efforts may be required to finalize a concept. The conceptual design process may also require negotiation with outside organizations, stakeholders or other legal entities on functional, technical, operational and performance requirements or standards. Value Management (VM) is a key process that supports reaching the best cost and benefit life-cycle cost alternative. VM should be employed as early as possible so that recommendations can be included in the planning and implemented without delaying the project or causing significant rework of designs. VM conducted during the early phases of a project yield the greatest cost reductions.

5.6.3 Preliminary Design

Initiates the process of converting concepts to a more detailed design whereby more detailed and reliable cost and schedule estimates are developed. This stage of the design is complete when it provides sufficient information to support development of the Performance Baseline (PB). The appropriate completion percentage is dependent upon the type of project. For basic facilities, such as administrative buildings, general purpose laboratories, and utilities, the design does not have to be as mature as for a complex chemical or nuclear processing facility. The design is mature when a point estimate can be developed and is ready for an independent review. The determination of a design completion percentage for reporting purposes will be made by the Architect-Engineer as well as by subsystem designers contracted to do the work, and/or other IPT members.

5.6.4 Final Design

Final design is the last stage of development prior to implementation. The purpose of the Final Design stage is to prepare final drawings, technical specifications and contract documents required to obtain bids and quotes for procurement and construction. The Final Design should include clear statements of testing requirements and acceptance criteria for the safety and functionality of all subsystems. The project scope should be finalized and changes (coordinated through a documented and approved change control process) should be permitted only for compelling reasons (i.e., substantial economies achieved through Value Engineering (VE), accommodation of changed conditions in

construction, or reduction in funds or changes in requirements). In any case, construction should not be allowed to proceed until the design is sufficiently mature to minimize change orders.

5.6.5 Design Reviews (including constructability reviews, where appropriate)
Design reviews are a vital component of the entire process and should be explicitly included in the schedule for the design effort. Design reviews shall be conducted by reviewers external to the project to document the completion of Conceptual Design, Preliminary Design and Final Design.

5.6.6 Design Submittals
Design submittals are required at completion of established design stages; design and technical reviews shall then be performed. There should also be a back-check review at design completion to verify that all comments made during the final design review stage have been addressed.

5.7 Earned Value Management
Please see Section 6.0 Goals and Measurements.

5.8 Environmental, Safety and Health Documentation Development
All projects must comply with environmental protection requirements, anticipated permitting requirements and cost-effective environmental stewardship, advance regional and local integrated planning goals and sustainable sites, and high performance and sustainable building principles.

5.9 Integrated Project Team
The Laboratory will select a Project Manager who shall organize and lead the Integrated Project Team (IPT). The IPT is an essential element in Laboratory's acquisition process and is involved in all phases of a project. This team consists of professionals representing diverse disciplines with the specific knowledge, skills and abilities to support the Project Manager in successfully executing a project. The team size and membership may change as a project progresses from CD-0 to CD-4 to ensure the necessary skills are always represented to meet project needs. Team membership may be full or part time, depending upon the scope and complexity of a project and the activities underway. However, the identified personnel must be available to dedicate an amount of time sufficient to contribute to the IPT's success.

5.10 Integrated Safety Management System
The Laboratory's Integrated Safety Management System (ISMS) is in place to ensure that potential hazards are identified and appropriately addressed throughout the project. It will be used to systematically integrate safety into management and work processes at all levels.

5.11 Key Performance Parameters
A Key Performance Parameter (KPP) is defined by CD-2 and is a characteristic, function, requirement or design basis that if changed would have a major impact on the system or facility performance, schedule, cost and/or risk. In some cases, a minimum KPP or threshold value should be highlighted for CD-4 (project completion) realizing in many instances full operational capabilities may take years to achieve. The minimum

KPPs and facility mission must stay intact for the duration of the project since they represent a foundational element within the original PB.

5.12 Lessons Learned Process

Lessons learned and best practices should be captured throughout the continuum of a project. Within 90 days of CD-3 approval, up-front project planning and design lessons learned shall be submitted to the Ames Laboratory Chief Operations Officer (COO). Likewise, project execution and facility start-up lessons learned shall be submitted within 90 days of CD-4 approval. Lessons learned reporting allows the exchange of information among Laboratory and DOE users in the context of project management.

5.13 Performance Baseline

The Performance Baseline (PB), as established in the Project Execution Plan (PEP), defines the TPC, CD-4 completion date, performance and scope commitment to which the Laboratory must execute a project and is based on an approved funding profile. The PB includes the entire project budget (total cost of the project that includes contingencies) and represents the Laboratory's commitment to DOE. The approved PB must be controlled, tracked and reported from the beginning to the end of a project to ensure consistency between the PEP and the Project Data Sheet (PDS).

5.14 Project Definition Rating Index

The project team will perform comprehensive front-end project planning to an appropriate level before establishing a PB at CD-2. The PDRI model assists the IPT in identifying key engineering and design elements critical to project scope definition. PDRI is to be implemented and used for projects with a TPC of $100 million or greater, as appropriate. This will be accomplished by the Project Manager. While not mandated, it is strongly encouraged for use by Programs for projects with a TPC less than $100 million.

5.15 Project Execution Plan

The PEP is the core document for the management of a project. The Project Manager is responsible for the preparation of this document. It establishes the policies and procedures to be followed in order to manage and control project planning, initiation, definition, execution and transition/closeout, and uses the outcomes and outputs from all project planning processes, integrating them into a formally approved document. It includes an accurate reflection of how the project is to be accomplished, the minimum KPPs for CD-4, resource requirements, technical considerations, risk management, configuration management, and roles and responsibilities. A preliminary PEP is required to support CD-1. This document continues to be refined throughout the duration of a project and revisions are documented through the configuration management process.

5.16 Project Funding

In approving the funding profile for completing the project, the Laboratory Budget Officer must determine that the proposed funding stream is affordable and executable within the program's capital and operations budget portfolio. Any changes to the approved funding profile that negatively impacts the project after CD-2 must be endorsed by the Laboratory Budget Officer. Prior to endorsement by the Budget Officer, Laboratory management will be notified of any proposed project funding profile changes.

5.17 Project Reporting

Approval of CD-0 initiates a requirement for project status reporting. Format and frequency for project reporting is determined by the Construction Program Manager for Operating Expensed Projects and General Plant Projects (GPP). For line item projects, project data is uploaded monthly in the DOE Project Assessment and Reporting System (PARS) in accordance with DOE Order 413.3B.

5.18 Project Assessments

Project performance assessments shall be determined through quantitative and qualitative methods. Elements to be reviewed include, but are not limited to, value management data, monthly reports, acquisition management practices, risk management status, peer reviews, site visits, staffing assessments, budget submittals, as well as discussions with the IPT members. Ratings shall be assessed against the current approved PB: Green – Project is expected to meet its current PB; Yellow – Project is potentially at risk of not meeting an element of the current PB; Red – Project is highly at risk of requiring a change to the PB or is not being executed within the PEP.

5.19 Project Reviews

Reviews are an important project activity and must be planned as an integral part of the project and tailored appropriately to project risk, complexity, duration and phase. Quarterly progress reviews will be completed for Operating Expensed Projects and General Plant Projects (GPP), and reported to the Ames Laboratory Chief Operations Officer (COO). DOE progress review requirements are outlined in DOE Order 413.3B for Line Item Projects.

5.20 Quality Assurance/Quality Control (QA/QC)

QA/QC begins at project inception and continues through all phases of the project. The Project Manager is responsible for quality and enforcing applicable QA/QC requirements. If the project is staying in-house, the Project Manager is responsible for developing a quality control plan. If an outside contractor is performing the work, each contractor is responsible for developing and submitting a quality control plan. The Project Manager must review, approve, and track each contractor's quality control plan as outlined in project specifications.

5.21 Risk Management

Risk Management is an essential element of every project and must be analytical, forward looking, structured and continuous. Risk assessments are started as early in the project life-cycle as possible and should identify critical technical, performance, schedule and cost risks. Once risks are identified and prioritized, sound risk mitigation strategies and actions are developed and documented in the Risk Register. Post CD-1, the risk register (including new risks) should be evaluated on a regular basis.

5.22 Safeguards and Security

5.22.1 Prior to CD-1, general safeguards and security requirements for the recommended alternative and preliminary identification of alternatives (including facility design and the incorporation of safeguards and security technologies) must be made and these alternatives evaluated with respect to their impact on mission needs, satisfaction of other requirements (such as safety requirements) and other cost considerations. This input becomes part of the conceptual design requirements for further development.

5.22.2 Prior to CD-2, a preliminary Security Vulnerability Assessment must be conducted that accounts for the set of applicable safeguards and security requirements, evaluates the methods selected to satisfy those requirements and addresses any potential risk acceptance issues. The PEP and the PB must be reviewed to ensure that cost, schedule, and integration aspects of safeguards and security are appropriately addressed, all feasible risk mitigation has been identified and concerns for which explicit line management risk acceptance will be required are appropriately supported.

5.22.3 Prior to CD-3, a final Security Vulnerability Assessment report should be prepared addressing all the safeguards and security requirements of the project. The project requirements should be satisfied by the facility design or the proposed operational features.

5.23 Site Development Planning

Projects including new construction or modifications to real property assets shall be included in the site's Ten Year Site Plan (TYSP) and must provide the necessary documentation to establish a property record in the DOE's Facilities Information Management System (FIMS) in accordance with DOE O 430.1B.

5.24 Tailoring

Tailoring is an element of the acquisition process and must be appropriate considering the risk, complexity, visibility, cost, safety, security and schedule of the project. Tailoring must be identified as early as possible prior to the impacted CD and must be approved by the Acquisition Executive (AE). In the tailoring strategy or the PEP, the Project Manager will identify those areas in which a project is planned to be tailored as well as an explanation and discussion of each tailored area. Tailoring does not imply the omission of requirements in the acquisition process or other processes that are appropriate to a specific project's requirements or conditions. Tailoring may involve consolidation or phasing of CDs, substituting equivalent documents, graded approach to document development and content, concurrency of processes, or creating a portfolio of projects to facilitate a single CD or Acquisition Strategy (AS) for an entire group of projects. Tailoring may also include adjusting the scope of Independent Project Reviews (IPRs) and External Independent Reviews (EIRs), delegation of acquisition authority and other elements. Major tailored elements such as consolidating or phasing CDs or delegation of AEs should be specified in the PEP or the Tailoring Strategy.

5.25 Technology Readiness Assessment

The TRA model evaluates technology maturity using the Technology Readiness Level (TRL) scale. TRAs and associated Technology Maturation Plans are used as a project management tool to reduce the technical and cost risks associated with the introduction of new technologies. Where technological readiness is a significant concern, TRAs should be considered for alternatives under consideration. For major system projects where new critical technologies are being deployed, the TRA shall be conducted and the associated Technology Maturation Plan developed prior to CD-2. On those projects where a significant critical technology element modification occurs subsequent to CD-2, conduct another TRA prior to CD-3. The TRA is not required of a project if: (1) the technology was adequately demonstrated previously in one or more separate projects; or (2) the objective of the project is to research scientific principles.

5.26 Project Management Training

Ames Laboratory's project managers are not required to be certified under the DOE Project Management Career Development Program (PMCDP). However, the PMCDP and the supporting Certification and Equivalency Guidelines (CEG) are good resources that describe the Knowledge, Skills, and Abilities (KSAs) that are relevant for project managers. Ames Laboratory project managers will improve their skills in the PMCDP topic areas listed below through internal and/or external training sessions.

- General Project Management
- Leadership/Team Building
- Scope Management
- Communication Management
- Quality/Safety Management
- Cost Management
- Time Management
- Risk Management
- Contract Management
- Integration Management
- Work and Development Activities
- Behavioral
- Leadership in Energy and Environmental Design (LEED)
- Capital Planning

5.27 Project Files/Folders

The FES administrative staff will create a hard-copy project folder and digital project folder on the FES shared drive for all new projects. The project folders will be turned over to the Project Manager to populate and maintain during the planning and execution phases of a project. Once the project is closed-out, the Project Manager will turn the folders back over to the administrative staff for filing.

6.0 GOALS AND MEASUREMENTS

Ames Laboratory will use Performance Baselines (PBs) and tailored Earned Value Management (EVM) for all projects to assess performance. A formal Earned Value Management System (EVMS) is only required by DOE Order 413.3B for projects with a TPC greater than $20 million. For projects with a TPC under $20 million, Ames Lab will measure performance by following the guiding principles of DOE Guide 413.3-10A, *Earned Value Management System (EVMS)*, and ANSI/EIA-748B, *Earned Value Management Systems*.

6.1 Performance Baseline (PB)

The key scope, cost, and schedule parameters will be defined for all projects. The PB includes the entire project budget (TPC including fees and contingencies) and represents the Laboratory's commitment to DOE for Operating Expensed Projects and GPP Projects, and DOE's commitment to Congress for Line Item Projects.

6.2 Earned Value Management (EVM)

A project performance method that utilizes an integrated set of performance measurements (e.g., scope, cost and schedule) to assess and measure project performance and progress, and estimate cost and schedule impacts at completion.

6.3 Earned Value Management System (EVMS)

EVMS is an integrated set of policies, procedures, and practices necessary to provide reliable and accurate project and program information to support project management as a decision making tool and a critical component of risk management. EVMS measures actual performance of work scope and the associated cost and schedule versus an agreed to baseline plan, while using disciplined means of baseline change control for documenting any changes to the agreed to baseline plan.

- Effectively integrates a project's work scope, cost, and schedule into a single Performance Measurement Baseline (PMB).
- Provides performance measurements against the PMB.
- Provides means of maintaining the integrity of the PMB by identifying, reviewing, approving, and incorporating changes in a timely manner.
- Provides reliable information necessary for trend analysis and evaluation of estimated costs based on performance used to predict future performance and arrive at an Estimate at Completion (EAC).
- Provides a sound basis for problem identification, corrective actions and management.

7.0 DEFINITIONS

Acquisition Executive: 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 Plan: The document that facilitates attainment of the acquisition objectives. The plan must identify: those milestones at which decisions should be made; all the technical, business, management; and other significant considerations that will control the acquisition including, but not limited to, market research, competition, contract type, source selection procedures and socio-economic considerations.

Acquisition Strategy: A high-level business and technical management approach designed to achieve project objectives within specified resource constraints with recognition of key project risks and the strategies identified to handle those risks. It is the framework for planning, organizing, staffing, controlling, and leading a project. It provides a master schedule for activities essential for project success, and for formulating functional strategies and plans.

Baseline: A quantitative definition of cost, schedule and technical performance that serves as a base or standard for measurement and control during the performance of an effort; the established plan against which the status of resources and the effort of the overall program, field program(s), project(s), task(s), or subtask(s) are measured, assessed and controlled. Once established, baselines are subject to change control discipline.

Baseline Change Proposal: A document that provides a complete description of a proposed change to an approved performance baseline, including the resulting impacts on the project scope, schedule, design, methods, and cost baselines.

Beneficial Occupancy: Stage of construction of a building or facility, before final completion, at which its user can occupy it for the purpose it was constructed. Beneficial occupancy does not imply that a project has reached CD-4.

Best Practices: An activity or procedure that has produced outstanding results in another situation and could be adapted to improve effectiveness and efficiency in a current situation.

Capital Assets: Capital assets are land, structures, equipment and intellectual property, which are used by the Federal Government and have an estimated useful life of two years or more. Capital assets exclude items acquired for resale in the ordinary course of operations or held for the purpose of physical consumption such as operating materials and supplies. Capital assets may be acquired in different ways: through purchase, construction, or manufacture; through a lease-purchase or other capital lease, regardless of whether title has passed to the Federal Government; or through exchange. Capital assets include the environmental remediation of land to make it useful, leasehold improvements and land rights; assets owned by the Federal Government but located in a foreign country or held by others (such as federal contractors, state and local governments, or colleges and universities); and assets whose ownership is shared by the Federal Government with other entities.

Capital Asset Project: A project with defined start and end points required in the acquisition of capital assets. The project acquisition cost of a capital asset includes both its purchase price and all other costs incurred to bring it to a form and location suitable for its intended use. It is independent of funding type. It excludes operating expense funded activities such as repair, maintenance or alterations that are part of routine operations and maintenance functions.

Change Control: A process that ensures changes to the approved baseline are properly identified, reviewed, approved, implemented and tested, and documented.

Code of Record: A set of requirements, including Federal and state laws, as defined in contracts and Standards or Requirements Identification Documents (or their equivalent), that are in effect at the time a facility or item of equipment was designed and accepted by DOE. It is initiated during the conceptual design phase and prior to approval of CD-1. It is placed under configuration control to ensure it is updated to include more detailed design requirements as they are developed during preliminary design and prior to improvements and land rights; assets owned by the Federal Government but located in a foreign country or held by others (such as federal contractors, state and local governments, or colleges and universities); and assets whose ownership is shared by the Federal Government with other entities.

Conceptual Design: The Conceptual Design process requires a mission need as an input. It is the exploration of concepts, specifications and designs for meeting the mission needs, and the development of alternatives that are technically viable, affordable and sustainable. The conceptual design provides sufficient detail to produce a more refined cost estimate range and to evaluate the merits of the project.

Confidence Level: The likelihood – expressed as a percentage – that an occurrence will be realized. The higher the confidence level, the higher the probability of success.

Configuration Management: The technical and administrative direction and surveillance actions taken to identify and document the functional and physical characteristics of a configuration item; to control changes to a configuration item and its characteristics; and to record and report change processing and implementation status.

Constructability Review: A technical review to determine the extent to which the design of a structure facilitates ease of construction, subject to the overall requirements for the completed form.

Construction: The erection, installation, or assembly of a new plant facility; the addition, expansion, improvement, or replacement of an existing facility; or the relocation of a facility. Construction includes equipment installed in and made part of the facility and related site preparation, excavation, filling and landscaping, or other land improvements; and design of the facility. Examples of improvements to an existing facility include the following types of work: Replacing standard walls with fireproof walls; Installing a fire sprinkler system in a space that was previously not protected with a sprinkler system; Replacing utility system components with a significantly larger capacity components (e.g., replacing a 200-ton chiller with a 300-ton chiller) and converting the functional purpose of a room (e.g., converting an office into a computer room).

Contractor Requirements Document: The DOE document that identifies the requirements that the prime contractor's project management system must satisfy.

Contingency: The portion of the project budget that is available for risk uncertainty within the project scope, but outside the scope of the contract. Contingency is budget that is not placed on the contract and is included in the TPC. Contingency is controlled by those designated in the PEP.

Corporate Certification: A corporate certification exists when a contractor adopts one of their existing certified EVMS in its entirety for application under a new contract, regardless of location. The EVMS under the corporate certification must remain intact in all aspects to that originally certified and will be validated by an EVMS Surveillance.

Critical Decision: A formal determination made by an organization at a specific point during the project that allows the project to proceed to the next phase or CD.

Critical Path: Those series of tasks that define the longest durations of the project. Each task on the critical path is a critical task and must finish on time for the entire project to finish on time.

Deactivation: The process of placing a facility in a stable and known condition including the removal of hazardous and radioactive materials to ensure adequate protection of the worker, public health and safety, and the environment, thereby limiting the long-term cost of surveillance and maintenance. Actions include the removal of fuel, draining and/or de-energizing nonessential systems, removal of stored radioactive and hazardous materials, and related actions. Deactivation does not include all decontamination necessary for the dismantlement and demolition phase of decommissioning, e.g., removal of contamination remaining in the fixed structures and equipment after deactivation.

Decommissioning: Takes place after deactivation and includes surveillance and maintenance, decontamination and/or dismantlement. These actions are taken at the end of the life of a facility to retire it from service with adequate regard for the health and safety of workers and the public and for the protection of the environment. The ultimate goal of decommissioning is unrestricted release or restricted use of the site.

Decontamination: The removal or reduction of residual chemical, biological, or radiological contaminants and hazardous materials by mechanical, chemical or other techniques to achieve a stated objective or end condition.

Demolition: Destruction and removal of physical facilities or systems.

Design Authority: The engineer designated by the Acquisition Executive to be responsible for establishing the design requirements and ensuring that design output documentation appropriately and accurately reflect the design basis. The Design Authority is responsible for design control and ultimate technical adequacy of the design process. These responsibilities are applicable whether the process is conducted fully in-house, partially contracted to outside organizations, or fully contracted to outside organizations. The Design Authority may delegate design work, but not its responsibilities.

Design-Build: A project delivery method whereby design and construction contracts are combined. It is important that specific flow down requirements specified in requests for proposals to subcontractors, especially for firm fixed-price subcontracts, to insure implementation of the principles from DOE Order 413.3B for effective performance measurement of the subcontractors' scope of work.

Design Review: A formal and documented management technique used primarily to conduct a thorough evaluation of a proposed design in order to determine whether or not the proposed design meets the project requirements set forth by the customer, as well as to determine whether the proposed design will be fully functional.

Deviation: Occurs when the TPC, CD-4 completion date, or performance and scope parameters, defined by the approved PB at CD-2, cannot be met.

Directed Change: A change caused by some DOE policy directives (such as those that have force and effect of law and regulation), regulatory, or statutory action and is initiated by entities external to the Department, to include external funding reductions.

Dismantlement: The disassembly or demolition and removal of any structure, system or component during decommissioning and satisfactory interim or long-term disposal of the residue from all or portions of a facility.

Disposal: Final placement or destruction of toxic, radioactive, or other waste, surplus or banned pesticides or other chemicals, polluted soils and drums containing hazardous materials from removal actions or accidental releases. Disposal may be accomplished through use of approved, secure, regulated landfills, surface impoundments, land farming, deep well injection or incineration.

Disposition: Those activities that follow completion of program missions, including but not limited to, preparation for reuse, surveillance, maintenance, deactivation, decommissioning, and long-term stewardship. DOE O 430.1B provides implementation guidance for requirements specific to the disposition and long-term stewardship of contaminated, excess facilities.

Earned Value: The budgeted value of work actually accomplished in a given time. Simply defined, earned value represents the value of work accomplished during the period.

Earned Value Management: A project performance method that utilizes an integrated set of performance measurements (e.g., scope, cost and schedule) to assess and measure project performance and progress, and estimate cost and schedule impacts at completion.

Earned Value Management System: An integrated set of policies, procedures and practices to objectively track true performance on a project or program. EVMS represents an integration methodology that is able to provide an early warning of performance problems while enhancing leadership decisions for successful corrective action.

Environmental Remedial Action Plan: Summarizes the remedial alternatives presented in the analysis of the feasibility study and identifies the preferred alternative and the rationale for selecting the preferred alternative.

EVMS Certification: The determination that a Contractor's EVMS, on all applicable projects, is in full compliance with ANSI/EIA-748B, or as required by the contract, and in accordance with FAR Subpart 52.234-4, EVMS.

EVMS Surveillance: The process of reviewing a Contractor's certified EVMS, on all applicable projects, to establish continuing compliance with ANSI/EIA-748B, or as required by the contract, and in accordance with FAR Subpart 52.234-4, EVMS. Surveillance may also verify that EVMS use is properly implemented by the contractor.

Energy Systems Acquisition Advisory Board: Advises the SAE on CDs related to Major System Projects, site selection and PB deviation dispositions.

Equivalencies: Alternatives to how a requirement in a directive is fulfilled in cases where the "how" is specified. These represent an acceptable alternative approach to achieving the goal of the directive. Unless specified otherwise in the directive, Equivalencies are granted, in consultation with the OPI, by the Program Secretarial Officer or their designee, or in the case of the NNSA, by the Administrator or designee, and documented for the OPI in a memorandum. For those directives listed in Attachment 1 of DOE O 410.1, CTA concurrences are required prior to the granting of equivalencies.

Estimate-At-Completion: Actual cost of work completed to date plus the predicted costs and schedule for finishing the remaining work.

Estimate-To-Complete: The value expressed in either dollars or hours developed to represent the cost of the work required to complete a task.

Exemptions: The release from one or more requirements in a directive. Unless specified otherwise in the directive, Exemptions are granted, in consultation with the OPI, by the Program Secretarial Officer or their designee, or in the case of the NNSA, by the Administrator or designee, and documented for the OPI in a memorandum.

External Independent Review: A project review performed by personnel from Office of Engineering and Construction Management (OECM) and augmented by individuals outside DOE, primarily to support validation of either the Performance Baseline (CD-2) or Construction/Execution Readiness (CD-3). OECM selects an appropriate group of subject matter experts in a contracted capacity to assist with these reviews.

Facilities Information Management System: DOE's corporate database for real property. The system provides the Department with an accurate inventory and management tool that assists with planning and managing all real property assets. See DOE O 430.1B for additional information.

Federal Program Manager: An individual in the headquarters organizational element responsible for managing a program and, until designation of the FPD, its assigned projects. They ensure that all the projects are properly phased, funded over time, and that each project manager is meeting their key milestones. They are the project manager's advocate, ensure proper resourcing and facilitate the execution process. They predict programmatic risks and put mitigation strategies in place so that projects are not affected.

Federal Project Director: The individual certified under the Department's PMCDP as responsible and accountable to the AE or Program Secretarial Officer for project execution. Responsibilities include developing and maintaining the PEP; managing project resources; establishing and implementing management systems, including performance measurement systems; and approving and implementing changes to project baselines.

Funding Profile: A representation of the project funding over the life of the project. It is part of the AE decision and any decremental change requires AE approval.

Final Design: Completion of the design effort and production of all the approved design documentation necessary to permit procurement, construction, testing, checkout and turnover to proceed.

General Plant Project: Miscellaneous minor new construction project, of a general nature, for which the total estimated cost may not exceed the congressionally established limit. GPPs are necessary to adapt facilities to new or improved production techniques, to effect economies of operations, and to reduce or eliminate health, fire and security problems. These projects provide for design and/or construction, additions, improvements to land, buildings, replacements or additions to roads and general area improvements.

Hot Commissioning: The processing of a minimal acceptable sample of an actual material to obtain the desired performance output during the startup and testing phase of a chemical or nuclear processing facility.

Independent: An office or entity that is not under the supervision, direction, or control of the sponsor responsible for carrying out the project's development or acquisition.

Independent Cost Estimate: A cost estimate, prepared by an organization independent of the project sponsor, using the same detailed technical and procurement information to make the project estimate. It is used to validate the project estimate to determine whether it is accurate and reasonable.

Independent Cost Review: An independent evaluation of a project's cost estimate that examines its quality and accuracy, with emphasis on specific cost and technical risks. It involves the analysis of the existing estimate's approach and assumptions.

Independent Government Cost Estimate: The government's estimate of the resources and its projected costs that a contractor would incur in the performance of a contract. These costs include direct costs such as labor, supplies, equipment, or transportation and indirect costs such

as labor overhead, material overhead, as well as general and administrative expenses, profit or fee. (Refer to FAR 36.203 and FAR 15.406-1.)

Independent Project Review: A project management tool that serves to verify the project's mission, organization, development, processes, technical requirements, baselines, progress and/or readiness to proceed to the next successive phase in DOE's Acquisition Management System.

Integrated Project Team: A cross-functional group of individuals organized for the specific purpose of delivering a project to an external or internal customer.

Integrated Safety Management System: The application of the integrated safety management system to a project or activity. The fundamental premise of Integrated Safety Management is that accidents are preventable through early and close attention to safety, design, and operation, and with substantial stakeholder involvement in teams that plan and execute the project, based on appropriate standards.

Key Performance Parameters: A vital characteristic, function, requirement or design basis that if changed, would have a major impact on the facility or system performance, scope, schedule, cost and/or risk, or the ability of an interfacing project to meet its mission requirements. A parameter may be a performance, design, or interface requirement. Appropriate parameters are those that express performance in terms of accuracy, capacity, throughput, quantity, processing rate, purity, reliability, sustainability, or others that define how well a system, facility or other project will perform. In aggregate, KPPs comprise the scope of the project.

Lessons Learned: The project management related input and output device that represents the knowledge, information or instructional knowledge that have been garnered through the process of actually completing the ultimate performance of the respective project. Lessons learned are valuable because they will benefit future endeavors and ideally prevent any negative happenings from taking place in the future.

Life-Cycle Costs: The sum total of all direct, indirect, recurring, nonrecurring and other related costs incurred or estimated to be incurred in the planning, design, development, procurement, production, operations and maintenance, support, recapitalization and final disposition of real property over its anticipated life span for every aspect of the program, regardless of funding source.

Line Item: A distinct design, construction, betterment or fabrication activity, effort or project for which Congress will be requested to authorize and appropriate specific funds (capital and/or operating), and where the resulting asset (structure, equipment, facility, product, system or plant) has an estimated useful life of two years or more. A full-scale test asset or other pilot/prototype asset primarily constructed for experimental or demonstration purposes, but planned to continue to operate beyond the experimental or demonstration phase is included in this definition. Budget requests for these projects require a supporting Project Data Sheet (PDS) regardless of funding type.

Long-Lead Procurement: Equipment, services and/or materials that must be procured well in advance of the need because of long delivery times. If long-lead procurements are executed prior to CD-3 approval for the project, this will be designated as CD-3A and require a stand-alone decision by the AE, outside of the CD process.

Major Item of Equipment: Capital equipment not related to a specific construction project. In most cases, capital equipment is installed with little or no installation or construction cost. However, in cases where the equipment requires provision of foundations, utilities, structural modifications, and/or additions to a building, the project can be defined as MIE. The associated construction activities must not constitute more than 20 percent of the costs of the equipment or exceed the GPP threshold established by Congress.

Major System Project: A project with a TPC of greater than or equal to $750M or as designated by the Deputy Secretary.

Management Reserve: An amount of the total contract budget withheld for management control purposes by the contractor. Management reserve is not part of the Performance Measurement Baseline.

Milestone: Any significant or substantive point, time or event of the project. Milestones typically refer to points at which large schedule events or series of events have been completed, and a new phase or phases are set to begin.

Mission Need Statement: The primary document supporting the AE's decision to initiate exploration of options to fulfill a capability gap including but not limited to acquisition of a new capital asset.

Mitigation: Technique to eliminate or lessen the likelihood and/or consequence of a risk.

Non-Major System: Any project with a TPC less than $750M.

Operating Expensed Projects: Minor construction projects developed to address a need or gap that the laboratory plans to fund with operating or overhead dollars.

Operational Readiness Review: A disciplined, systematic, documented, performance-based examination of facilities, equipment, personnel, procedures and management control systems for ensuring that a facility can be operated safely within its approved safety envelope as defined by the facility safety basis plan. The ORR provides the basis for the Department to direct startup or restart of the facility, activity or operation.

Other Project Costs: All other costs related to a project that are not included in the TEC. OPCs will include, but are not limited to: research and development; conceptual design and conceptual design report; startup and commissioning costs; NEPA documentation; PDS preparation; siting; and permitting requirements.

Performance Baseline: The collective key performance, scope, cost, and schedule parameters, which are defined for all projects at CD-2. The PB includes the entire project budget (TPC including fees and contingencies) and represents the Laboratory’s commitment to DOE for Operating Expensed and GPP Projects, and DOE's commitment to Congress for Line Item Projects.

Performance Measurement Baseline: The baseline cost that encompasses all project work packages and planning packages, derived from summing all the costs from the Work Breakdown Structure (WBS). Undistributed management reserve, contingency, profit, fee and DOE direct costs are not part of the Performance Measurement Baseline. The PMB is the benchmark used within EVM systems to monitor project (and contract) execution performance.

Preliminary Design: This is the design that is prepared following CD-1 approval. Preliminary design initiates the process of converting concepts to a design appropriate for procurement or construction. All KPPs and project scope are sufficiently defined to prepare a budget estimate. This stage of the design is complete when it provides sufficient information to support development of the PB.

Program: An organized set of activities directed toward a common purpose or goal undertaken or proposed in support of an assigned mission area. It is characterized by a strategy for accomplishing a definite objective(s) that identifies the means of accomplishment, particularly in qualitative terms, with respect to work force, material and facility requirements. Programs are typically made up of technology-based activities, projects and supporting operations.

Program Management: A group of closely-related projects managed in a coordinated way.

Project: A unique effort having defined start and end points undertaken to create a product, facility, or system. Built on interdependent activities planned to meet a common objective, a project focuses on attaining or completing a deliverable within a predetermined cost, schedule and technical scope baseline. Projects include planning and execution of construction, assembly, renovation, modification, environmental restoration, decontamination and decommissioning, large capital equipment, and technology development activities. A project is not constrained to any specific element of the budget structure (e.g., operating expense).

Project Assessment and Reporting System: A reporting process to connect field project status with headquarters to report and compare budgeted or scheduled project forecasts.

Project Closeout: Occurs after CD-4, Project Completion, and involves activities such as performing financial and administrative closeout, developing project closeout and lessons learned reports, and other activities as appropriate for the project.

Project Data Sheet: A document that contains summary project data and the justification required to include the entire project effort as a part of the budget.

Project Definition Rating Index: This is a project management tool which is used for assessing how well the project scope is defined. The tool uses a numeric assessment which rates a wide range of project elements to determine how well the project is defined.

Project Engineering and Design: Design funds established for use on preliminary design. Typically, PED funds are used for preliminary and final design and related activities for design-bid-build strategies, and for preliminary design and related costs in design-build strategies. It is also analogous with a project phase that includes preliminary and final design and baseline development.

Project Execution Plan: DOE's core document for management of a project. It establishes the policies and procedures to be followed in order to manage and control project planning, initiation, definition, execution, and transition/closeout, and uses the outcomes and outputs from all project planning processes, integrating them into a formally approved document. A PEP includes an accurate reflection of how the project is to be accomplished, resource requirements, technical considerations, risk management, configuration management, and roles and responsibilities.

Project Management: Those services provided on a specific project, beginning at the start of design and continuing through the completion of construction, for planning, organizing, directing, controlling and reporting on the status of the project.

Project Management Plan: A prepared document that sets forth the plans, organization and systems that the project manager will utilize to manage the project. Its content and the extent of detail of the PMP will vary in accordance with the size and type of project and state of project execution.

Project Management Support Office: An office established exclusively to oversee and manage the activities associated with projects.

Project Peer Reviews: Periodic review of a project performed by peers (with similar experience to project personnel), independent from the project, to evaluate technical, managerial, cost and scope, and other aspects of the project, as appropriate. These reviews are typically led by the PMSO.

Quality Assurance: All those actions performed during the project that provide confidence that quality is achieved. It is executed through a formalized Quality Assurance Program.

Quality Control: Those actions related to the physical characteristics of a material, structure, component, or system which provide a means to control the quality of the material, structure, component, or system to predetermined requirements.

Readiness Assessment: An assessment to determine a facility's readiness to startup or restart when an Operational Readiness Review (ORR) is not required or when a contractor's standard procedures for startup are not judged by the contractor or DOE management to provide an adequate verification of readiness.

Resource-Loaded Schedule: Schedules with resources of staff, facilities, cost, equipment and materials which are needed to complete the activities required.

Risk: Factor, element, constraint or course of action that introduces an uncertainty of outcome, either positively or negatively that could impact project objectives.

Risk Assessment: Identification and analysis of project and program risks to ensure an understanding of each risk in terms of probability and consequences.

Risk Management: The handling of risks through specific methods and techniques. Effective risk management is an essential element of every project. The DOE risk management concept is based on the principles that risk management must be analytical, forward-looking, structured, informative and continuous. Risk assessments should be performed as early as possible in the project and should identify critical technical, performance, schedule and cost risks. Once risks are identified, sound risk mitigation strategies and actions should be developed and documented.

Risk Management Plan: Documents how the risk processes will be carried out during the project.

Rough Order of Magnitude Estimate: An estimate based on high-level objectives, provides a high-level view of the project deliverables, and has lots of wiggle room. Most ROM estimates have a range of variance from -25% all the way to +75%.

Safeguards and Security: An integrated system of activities, systems, programs, facilities and policies for the protection of classified information and/or classified matter, unclassified control information, nuclear materials, nuclear weapons, nuclear weapon components, and/or the Department's and its contractors' facilities, property and equipment.

Sustainability: To create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic and other requirements of present and future generations.

System Engineering Approach: A proven, disciplined approach that supports management in clearly defining the mission or problem; managing system functions and requirements; identifying and managing risk; establishing bases for informed decision-making; and, verifying that products and services meet customer needs. The goal of the system engineering approach is to transform mission operational requirements into system architecture, performance parameters and design details.

Tailoring: An element of the acquisition process and must be appropriate considering the risk, complexity, visibility, cost, safety, security, and schedule of the project. Tailoring does not imply the omission of essential elements in the acquisition process or other processes that are appropriate to a specific project's requirements or conditions.

Technical Independent Project Review: An independent project review conducted prior to obtaining CD-2, for Hazard Category 1, 2, and 3 nuclear facilities. At a minimum, the focus of this review is to determine that the safety documentation is sufficiently conservative and bounding to be relied upon for the next phase of the project.

Technology Maturation Plan: A TMP details the steps necessary for developing technologies that are less mature than desired to the point where they are ready for project insertion.

Technology Readiness Assessment: An assessment of how far technology development has proceeded. It provides a snapshot in time of the maturity of technologies and their readiness for insertion into the project design and execution schedule.

Technical Readiness Level: A metric used for describing technology maturity. It is a measure used by many U.S. government agencies to assess maturity of evolving technologies (materials, components, devices, etc.) prior to incorporating that technology into a system or subsystem.

Total Estimated Cost: All engineering design costs (after conceptual design), facility construction costs and other costs specifically related to those construction efforts. TEC will include, but is not limited to: project, design and construction management; contract modifications (to include equitable adjustments) resulting in changes to these costs; design; construction; contingency; contractor support directly related to design and construction; and equipment rental and refurbishment.

Total Project Cost: All costs between CD-0 and CD-4 specific to a project incurred through the startup of a facility, but prior to the operation of the facility. Thus, TPC includes TEC plus OPC.

Value Engineering: A structured technique commonly used in project management to optimize the overall value of the project. Often, creative strategies will be employed in an attempt to achieve the lowest life-cycle cost available for the project. The VE effort is a planned, detailed review/evaluation of a project to identify alternative approaches to providing the needed assets.

Value Management: An organized effort directed at analyzing the functions of systems, equipment, facilities, services and supplies for achieving the essential functions at the lowest life-cycle cost that is consistent with required performance, quality, reliability and safety. VM encompasses VE.

Value Study: An intensive review of requirements and the development of alternatives by the use of appropriate value techniques utilizing aspects of engineering, requirements analysis, the behavioral sciences, creativity, economic analysis and the scientific method.

Variance: A measurable change from a known standard or baseline. It is the difference between what is expected and what is actually accomplished. A variance is a deviation or departure from the approved scope, cost or schedule performance. Variances must be tracked and reported. They should not be eliminated, but mitigated through corrective actions. Baseline changes, if needed, are submitted for changes in technical scope, funding or directed changes.

Work Breakdown Structure: Used by the project management team to organize and define a project into manageable objectives and create a blueprint by which the steps leading to the completion of a project are obtained. It is an outline of the project that becomes more detailed under the subheadings or work packages.

8.0 ACRONYMS

AE Acquisition Executive
ANSI American National Standards Institute
AP Acquisition Plan
AS Acquisition Strategy
ASME American Society of Mechanical Engineers
BCP Baseline Change Proposal
BOD Beneficial Occupancy Date
CCB Change Control Board
CD Critical Decision
CDNS Chief of Defense Nuclear Safety
CDR Conceptual Design Report
CFO Office of the Chief Financial Officer
CFR Code of Federal Regulations
CNS Chief of Nuclear Safety
CRD Contractor Requirements Document
CSDR Conceptual Safety Design Report
CSVR Conceptual Safety Validation Report
CTA Central Technical Authority
DOE U.S. Department of Energy
EAC Estimate-At-Completion
EIA Electronic Institute of America
EIR External Independent Review
EM Environmental Management
EO Executive Order
ESAAB Energy Systems Acquisition Advisory Board
EVMS Earned Value Management System
FAR Federal Acquisition Regulation
FPD Federal Project Director

FIMS	Facility Information Management System
FY	Fiscal Year
G	Guide
GAO	Government Accountability Office
GPP	General Plant Project
ICE	Independent Cost Estimate
ICR	Independent Cost Review
IPA	Intergovernmental Personnel Act
IPR	Independent Project Review
IPT	Integrated Project Team
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
KPP	Key Performance Parameter
LEED	Leadership in Energy and Environmental Design
M	Manual
MIE	Major Items of Equipment
MNS	Mission Need Statement
M&O	Management and Operating
NDIA	National Defense Industrial Association
NEPA	National Environmental Policy Act
NNSA	National Nuclear Security Administration
NRC	U.S. Nuclear Regulatory Commission
NQA	Nuclear Quality Assurance
O	Order
OBS	Organizational Breakdown Structure
OE	Operating Expense
OECM	Office of Engineering and Construction Management
OMB	Office of Management and Budget
OPC	Other Project Costs
ORR	Operational Readiness Review
P	Policy
PARS	Project Assessment and Reporting System
PB	Performance Baseline
PDRI	Project Definition Rating Index
PDS	Project Data Sheet
PDSA	Preliminary Documented Safety Analysis
PED	Project Engineering and Design
PEP	Project Execution Plan
PHAR	Preliminary Hazard Analysis Report
PL	Public Law
PMB	Performance Measurement Baseline
PMCDP	Project Management Career Development Program
PMSO	Project Management Support Office
PMSC	Program Management Systems Committee
PSDR	Preliminary Safety Design Report
PSO	Program Secretarial Office
PSVR	Preliminary Safety Validation Report
PMP	Project Management Plan
QA	Quality Assurance

QAP	Quality Assurance Program
QPR	Quarterly Project Review
RA	Readiness Assessment
RMP	Risk Management Plan
ROM	Rough Order of Magnitude
SAE	Secretarial Acquisition Executive
SBAA	Safety Basis Approval Authority
SDS	Safety Design Strategy
SER	Safety Evaluation Report
SPE	Senior Procurement Executive
STD	Standard
TEC	Total Estimated Cost
TIPR	Technical Independent Project Review
TPC	Total Project Cost
TMP	Technology Maturation Plan
TRA	Technology Readiness Assessment
TRL	Technology Readiness Level
USC	United States Code
VE	Value Engineering
VM	Value Management
WBS	Work Breakdown Structure

9.0 REFERENCES

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