U.S. Department of Energy
` Washington, D.C.

ORDER

DOE O 413.3B

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Chg 3 (PgChg): 12-20-2016
Chg 4 (MinChg): 10-13-2017
Chg 5 (MinChg): 04-12-2018

SUBJECT: PROGRAM AND PROJECT MANAGEMENT FOR THE ACQUISITION OF CAPITAL ASSETS

1. PURPOSE.

   a. To provide the Department of Energy (DOE) Elements, including the National Nuclear Security Administration (NNSA), with program and project management direction for the acquisition of capital assets with the goal of delivering projects within the original performance baseline (PB), cost and schedule, and fully capable of meeting mission performance, safeguards and security, and environmental, safety, and health requirements unless impacted by a directed change.

   b. To implement Office of Management and Budget (OMB) Circulars to include: A-11, and its supplement, *Capital Programming Guide*, which prescribes new requirements and leading practices for project and acquisition management; A-123, *Management's Responsibility for Internal Control*, which defines management's responsibility for internal control in Federal agencies; and A-131, *Value Engineering*, which requires that all Federal agencies use Value Engineering (VE) as a management tool.

2. CANCELLATION. This Order cancels DOE O 413.3A, Chg 1, *Program and Project Management for the Acquisition of Capital Assets*, dated 11-17-08. Cancellation of a directive does not, by itself, modify or otherwise affect any contractual or regulatory obligation to comply with the directive. Contractor Requirements Documents (CRDs) that have been incorporated into a contract remain in effect throughout the term of the contract unless and until the contract is modified to either eliminate requirements that are no longer applicable or substitute a new set of requirements.

3. APPLICABILITY.

   a. Departmental Applicability.

      The requirements identified in this Order are mandatory for all DOE Elements (unless identified in Paragraph 3.c., Equivalencies/Exemptions) for all capital asset projects having a Total Project Cost (TPC) greater than $50M, except that during the project development phase, Under Secretaries may reduce the threshold to $10M for nuclear projects or complex first-of-a-kind projects. Any reference to a Program Secretarial Officer (PSO) in this Order is also applicable to the Deputy Administrator/Associate Administrators for the NNSA.

The principles (see Appendix C, Paragraph 1.a.-l.) as set forth in this Order apply to all capital asset projects. They also apply to General Plant Projects (GPPs) for which the approved total estimated cost does not exceed the minor construction threshold, using a tailored approach.

All projects with a TPC greater than $50M are required to report progress and provide documentation in the Project Assessment and Reporting System (PARS II) at Critical Decision (CD)-0 and thereafter, in accord with Appendix C. After CD-2 is approved for projects with a TPC greater than $50M, earned value reporting shall apply.

Additionally, for all projects with a TPC greater than $50M, all approved CD or equivalent documents and performance baseline changes shall be submitted to the Office of Project Management Oversight and Assessments (PM).

This Order does not apply to Financial Assistance Awards (grants and cooperative agreements) covered under 2 CFR Parts 200 and 910 and 10 CFR Part 600 (legacy awards).

The Administrator of NNSA will assure that NNSA employees and contractors comply with their respective responsibilities under this directive. Nothing in this Order will be construed to interfere with the NNSA Administrator's authority under Section 3212(d) of Public Law (P.L.) 106-65 to establish Administration-specific policies, unless disapproved by the Secretary.

b. DOE Contractors.

Except for the equivalencies/exemptions in paragraph 3.c., the CRD (Attachment 1) sets forth requirements of this Order that will apply to contracts that include the CRD.

The CRD must be included in all contracts that make the contractor responsible for planning, design, construction and execution of capital asset projects subject to this Order.

c. Equivalencies/Exemptions. Equivalencies and exemptions to this Order are processed in accordance with DOE O 251.1D, Departmental Directives Program. Central Technical Authority (CTA) (or designee) concurrence is required for both exemptions and equivalencies to this Order for nuclear facilities. The Deputy Secretary must approve all equivalencies and exemptions to the requirements delineated in this Order except for those stipulated in Paragraphs 3.c.(3)-(4).

(1) Equivalency. In accordance with the responsibilities and authorities assigned by Executive Order (EO) 12344, codified at 50 USC Sections 2406 and 2511 and to ensure consistency through the joint Navy/DOE Naval Nuclear Propulsion Program, the Deputy Administrator for Naval

Reactors (Director) will implement and oversee requirements and practices pertaining to this Directive for activities under the Director's cognizance, as deemed appropriate.

(2) Equivalency. Bonneville Power Administration in accordance with Secretarial Delegation Order 00-033.00B, dated 7-20-09.

(3) Exemption – Specific Capital Asset Project. For PSOs that are not exempt as defined in Paragraph 3.c.(4) of this Order, the Programs may present cases to the Project Management Risk Committee (PMRC) for a specific project to have an exemption from a specific Order requirement. If the consensus of the committee is to endorse the exemption request, approval of the exemption request will be made by the appropriate Under Secretary. However, if consensus cannot be attained, at the discretion of the Program, the exemption request may be forwarded to the Deputy Secretary as the Chief Executive for Project Management (CE) with formal review by the PMRC outlining the advantages and disadvantages of the proposed exemption. In this case, the exemption request will be entered into, and processed through, the Department's formal collaboration process.

(4) Exemption. PSOs that meet all of the following criteria may be excluded from specific requirements of this Order. The intent of this exemption is to shift CD authority to the PSO and place those activities normally carried out by PM in the hands of the Project Management Support Office (PMSO). They must have:

- An established PMSO with adequate project management requirements, processes and procedures defined to enable continued project success. This will be validated by PM and must be consistent with the Acquisition Management System delineated in the Order;

- An on-going set of active capital asset projects, post CD-2, of over 5 projects at any time during the current Fiscal Year (FY); and

- Completed 90% of projects across a three-year rolling average, not to exceed by more than 10% of the original cost baseline for the original approved scope at CD-2 for all capital asset projects with a TPC greater than $50M.

To allow PM to determine Departmental-wide metrics and to permit an independent validation of the PSO eligibility to exercise this exemption, all PSOs are still required to:

- Report all projects into PARS II monthly, including earned value data, when applicable.
- Submit all CD or equivalent documents to PM.
- Submit Performance Baseline Change Proposal approvals to PM.
- PM will lead Independent Cost Reviews and Independent Cost Estimates as delineated in Appendix A, Tables 2.0 through 2.3.

For PSOs that are eligible for the exemption, the Deputy Secretary must take affirmative action and approve the exemption through an action memorandum from the PSO with concurrence from PM. The Deputy Secretary may specify exceptions (e.g., retain high profile projects).

Additionally, the nuclear safety-related requirements of the Order, including DOE-STD-1189-2016, shall not be exempted. Further, this exemption does not apply to defense nuclear facilities.

The Deputy Secretary shall rescind this exemption if the PSOs are unable to maintain the exemption requirements listed previously. The exemption may also be rescinded at any time at the discretion of the Deputy Secretary.

(5) When a PSO is no longer exempt, the requirements of this Order must be implemented within six months. Specifically, projects reaching a particular CD or project closeout within six months of exemption rescission are not required to comply with this Order for approval of that CD. Those reaching a CD after six months of exemption rescission shall comply with this Order to gain approval of that particular CD or for project closeout.

4. REQUIREMENTS.

a. General.

(1) Detailed requirements on capital asset projects are provided in this Order.

(2) Guides are not requirements documents and are not to be construed as requirements in any audit or appraisal for compliance with the parent Policy, Order, Notice, or Manual. The Guides referenced in this Order are meant as suggestions or potential guidelines for content and purpose of documents.

Tailoring is necessary for the efficient delivery of projects and should be applied to all projects considering size, complexity, cost, and risks. Tailoring does not imply the omission of requirements, and requirements

must be addressed to the extent necessary and practical. Tailoring may involve consolidation or phasing of CDs, substituting equivalent documents, using a 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 the 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 Project Management Executive (PME) duties must be specified in the Project Execution Plan (PEP) or the Tailoring Strategy and approved by the PME. For Hazard Category 1, 2, and 3 nuclear facilities, the Tailoring Strategy must include the approach to satisfying DOE-STD-1189-2016 safety document development.

b. Implementation. The requirements in this update must be implemented immediately upon issuance of this Order. Programs are not required to revisit previously achieved critical decisions.

5. RESPONSIBILITIES. Key roles and responsibilities of line managers are described in Appendix B.

6. INVOKED STANDARDS. The following DOE technical standards and industry standards are invoked as required methods in this Order in accordance with the applicability and conditions described within this Order. Any technical standard or industry standard that is mentioned in or referenced by this Order, but is not included in the list below, is not invoked by this Order. Note: DOE O 251.1D, Appendix J, provides a definition for "invoked technical standard."

a. DOE-STD-1189-2016, *Integration of Safety into the Design Process*. This DOE technical standard is required to be used for development and integration of safety analysis and supporting design for new nuclear facilities and applicable modifications. See Appendix A and Attachment 1 for specific requirements.

b. DOE-STD-1073-2016, *Configuration Management*. This DOE technical standard is required to be used in the establishment of a configuration management process for new nuclear facilities and applicable modifications. See Attachment 1, Section 9 for specific requirements.

c. DOE-STD-1104-2016, *Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents*. This DOE technical standard is invoked by DOE O 420.1C, *Facility Safety*, and therefore treated as a requirement in this Order for DOE review and approval of safety basis and safety design basis documents for nuclear facilities.

7. DEFINITIONS. See Attachment 2. See Attachment 3 for Acronyms.

8. REFERENCES. See Attachment 4.

9. CONTACT. Questions concerning this Order should be directed to PM, 202-586-3524.

BY ORDER OF THE SECRETARY OF ENERGY:

DAN R. BROUILLETTE
Deputy Secretary

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APPENDIX A
REQUIREMENTS

1. Objective.

The Department's ultimate objective is to deliver every project at the original PB, on schedule, within budget, and fully capable of meeting mission performance, safeguards and security, quality assurance (QA), sustainability, and environmental, safety, and health requirements. Consistent with this objective, a project shall be completed at CD-4 within the original approved performance baseline (CD-2), unless otherwise impacted by a directed change.

The authority and accountability for any project, including its costs, must be vested firmly in the hands of the Federal Project Director (FPD).

Some cost estimate, or cost range, should be provided at each CD gateway, but the degree of rigor and detail for a cost estimate should be carefully defined, depending on the degree of confidence in project scale and scope that is reasonable to expect at that stage. Whatever figure or range that is provided should explicitly note relevant caveats concerning uncertainties inherent in estimates at CD-0 and CD-1 stages.

A project owner should never be the sole cost estimator, at any stage (i.e., from CD-0 on), given the inherent conflict of interest.

The second cost estimator should come from outside of the line manager’s chain of command, to avoid conflict of interest.

2. DOE Acquisition Management System.

The DOE Acquisition Management System establishes principles and processes that translate user needs and technological opportunities into reliable and sustainable facilities, systems, and assets that provide a required mission capability. The system will be organized by project phases and CDs, progressing from broadly-stated mission needs into well-defined requirements resulting in operationally effective, suitable, and affordable facilities, systems, and other products.

Within DOE, projects typically progress through five CDs, which serve as major milestones approved by the Chief Executive for Project Management (CE) or PME. Each CD marks an authorization to increase the commitment of resources by DOE and requires successful completion of the preceding phase or CD. The amount of time between decisions will vary. The CDs are:

- CD-0, Approve Mission Need. There is a need that cannot be met through other than material means;

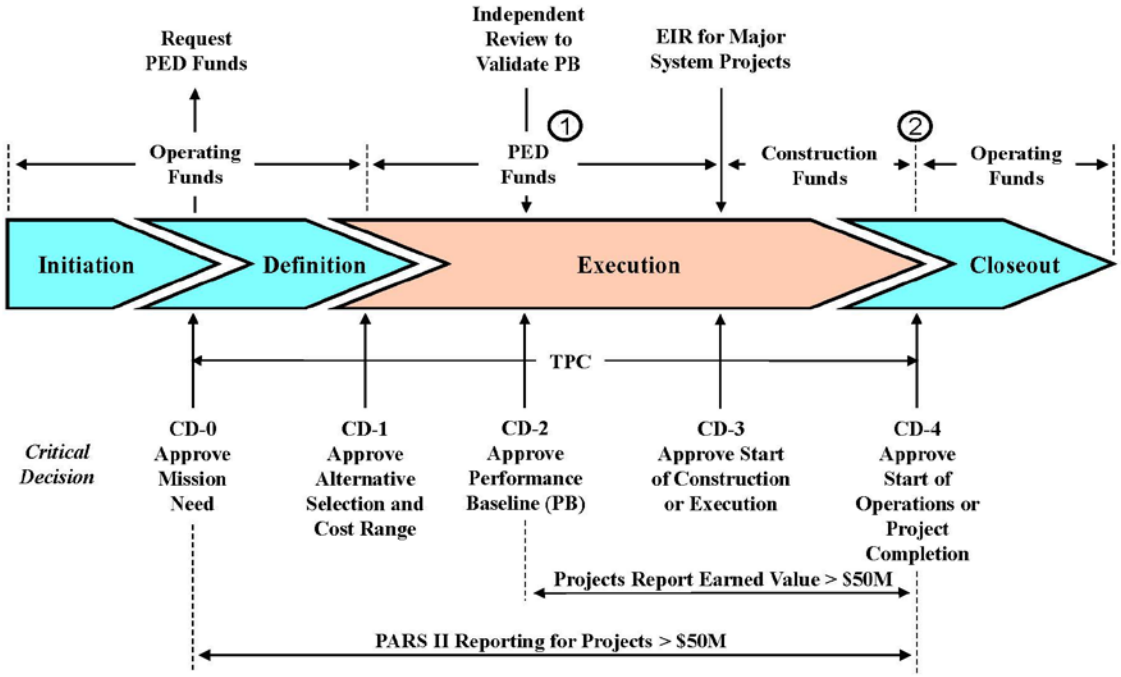
- CD-1, Approve Alternative Selection and Cost Range. The selected alternative and approach is the optimum solution;

- CD-2, Approve Performance Baseline. Definitive scope, schedule and cost baselines have been developed;

- CD-3, Approve Start of Construction/Execution. The project is ready for implementation; and

- CD-4, Approve Start of Operations or Project Completion. The project is ready for turnover or transition to operations, if applicable.

Figure 1 illustrates the requirements for the typical implementation of the DOE Acquisition Management System for Line Item Capital Asset Projects. Figure 2 depicts the implementation for Other Capital Asset Projects such as Major Items of Equipment (MIE) and Operating Expense (OE) projects.



NOTES:
1. PED funds can be used after CD-3 for design.
2. Operating Funds may be used prior to CD-4 for transition, startup, and training costs.

Figure 1. Typical DOE Acquisition Management System for Line Item Capital Asset Projects

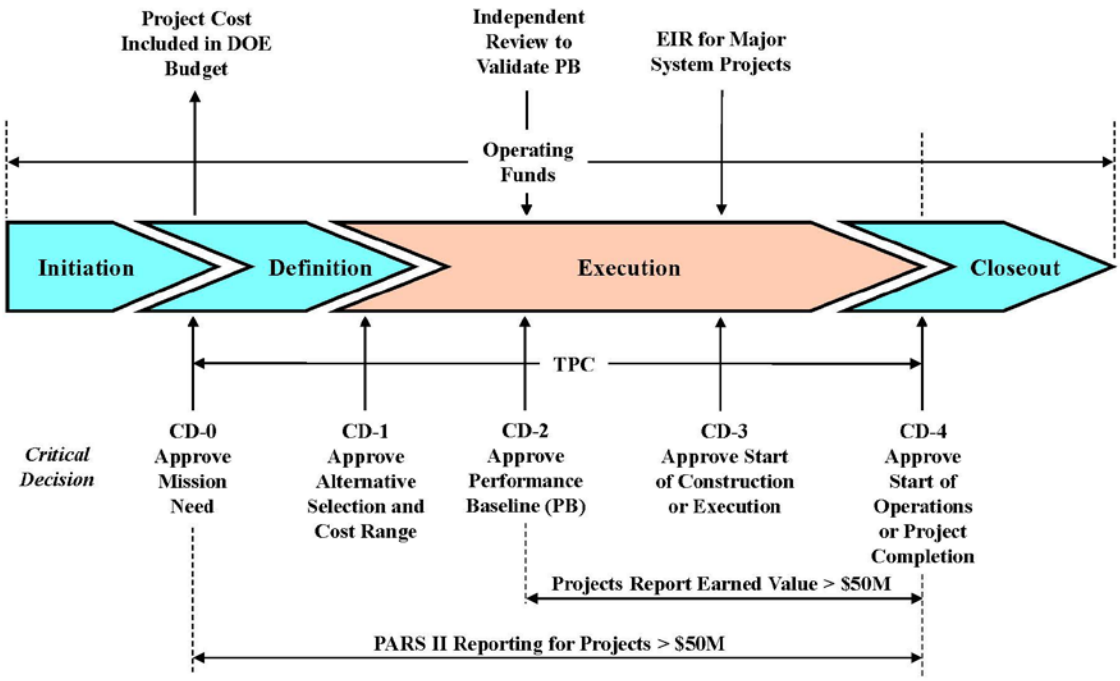


Figure 2. Typical DOE Acquisition Management System for Other Capital Asset Projects (i.e., Major Items of Equipment and Operating Expense Projects)

3. Critical Decision Approval Authority and Thresholds.

The Deputy Secretary serves as the Department's CE and promulgates Department-wide policy and direction. The CD authorities, thresholds and delegations are identified in Table 1.

a. Major System Projects.

Projects with a TPC greater than or equal to $750M are Major System Projects. All Major System Project CDs must be proposed by the appropriate PSO and approved by the Deputy Secretary as DOE's designated CE before proceeding to the next project phase or CD.

b. Non-Major System Projects.

Projects with a TPC less than $750M are Non-Major System Projects. The designated PME must approve all Non-Major System Project CDs, except for CD-0, which cannot be delegated below the PSO.

Table 1. Critical Decision Authority Thresholds

Critical Decision Authority	Total Project Cost Thresholds
Deputy Secretary	≥ $750M (or any project on an exception basis when designated by the Deputy Secretary) **Further delegation is allowed.**
Under Secretaries	≥ $100M and < $750M (or any project on an exception basis when designated by the Under Secretaries) **Further delegation is allowed.**
Program Secretarial Officer	> $50M and < $100M **Further delegation is allowed.**

4. Requirements for Approval of Critical Decisions.

a. CD-0, Approve Mission Need.

The Initiation Phase begins with the identification of a mission-related need. A Program Office 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 Department's 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 Program Office the flexibility to explore a variety of solutions and not limit potential solutions (refer to DOE G 413.3-17). Table 2.0 lists the requirements needed to attain CD-0.

The cost range provided at CD-0 should be Rough-Order of Magnitude (ROM) and is used to determine the PME authority designation. It does not represent the PB, which will be established at CD-2.

Table 2.0 CD-0 Requirements[1]	
Prior to CD-0	**Approval Authority[2]**
Perform Pre-Conceptual Planning activities that focus on the Program Offices' strategic goals and objectives, safety planning, design, development of capability gaps, high-level project parameters, a ROM cost range, and schedule estimates.	
Perform a Mission Validation Independent Review on all Major System Projects. (Refer to DOE G 413.3-9.)	PSO
Approve a Mission Need Statement Document with recommendation from PM for projects with a TPC ≥ $100M. (Refer to DOE G 413.3-17.)	PSO
For Major System Projects, or for projects as designated by the CE, PM will conduct an Independent Cost Review (ICR).	
For Major System Projects, the Project Management Risk Committee (PMRC) will review and analyze the CD and make recommendations to the ESAAB, CE, or PME, as applicable, before approval.	CE ≥ $750M
For NNSA only, prepare a Program Requirements Document that defines the ultimate goals which the project must satisfy. (Refer to NNSA Business and Operating Policy.)	PSO
***For Hazard Category 1, 2, and 3 nuclear facilities**, and to the specificity possible, document DOE expectations for Safety-in-Design. (Refer to DOE-STD-1189-2016.)*	*Safety Basis Approval Authority (SBAA)*
Post CD-0 Approval	
Submit all CD documents to PM.	
Develop a Project Data Sheet (PDS) for Line Item Projects to request Project Engineering and Design (PED) funds. Develop funding documents for MIE or OE projects for the design, and OMB A-11 Business Cases. (Refer to DOE CFO Budget Call for PDS and Business Case Template.)	
Initiate monthly PARS II reporting (excluding earned value data). FPD, Program Manager and PM will provide monthly assessments, as appropriate.	
Initiate Quarterly Project Reviews (QPRs) with the PME or their designee.	
Conduct a project peer review of active projects when the top-end range is $100M or greater.	
Proceed with conceptual planning and design used to develop alternative concepts and functional requirements using operating funds.	
NOTES: 1. Documents and reports are not intended to be stand-alone and may be combined. 2. Where no approval authorities are noted, authorities are established through other directives or the Program Offices (e.g., Functions and Requirements Assignment Matrix). 3. Title 10 CFR Part 830 does not apply to accelerators and their operations.	

b. CD-1, Approve 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, safety strategies, risk

identification and analysis, acquisition strategies, and concept exploration in order to evolve a cost-effective, preferred solution to meet a mission need (refer to DOE G 413.3-1 for more information). 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 PED funds to be used. Table 2.1 lists the requirements needed to attain CD-1.

For each project, the appropriate Under Secretary will designate a project owner. Each Under Secretary will also establish a clear line of functional responsibility that extends from the Under Secretary to the project owner to the Federal Project Director. This shall be documented in the preliminary project execution plan at CD-1.

The cost range provided at CD-1 is the preliminary estimate for the selected alternative. As CD-1 progresses to CD-2, the TPC will be refined and the TPC established at CD-2 may be higher than the range defined at CD-1, in which case the PME must be notified. The CD-1 cost range is not the PB cost. The PB against which project success is measured will be established at CD-2. The only exception is when a construction budget request is submitted in advance of an approved CD-2. In this circumstance, refer to Appendix A, Paragraph 4.c.(2).

If the top end of the original approved CD-1 cost range grows by more than 50% as the project proceeds toward CD-2, the Program, in coordination with the PME, must reassess the alternative selection process. Upon completing the review, the PME must approve a revised CD-1 identifying the new or reaffirmed selected alternative and an updated CD-1 cost range. This revised CD-1 information, to include the new CD-1 cost range and CD-1 approval date, will be reflected within PARS II and all subsequent PDS and similar project documentation.

Table 2.1 CD-1 Requirements[1]

Prior to CD-1	**Approval Authority[2]**
Approve an Acquisition Strategy (AS) with endorsement from PM for Major System Projects. (Refer to DOE G 413.3-13.)	PSO
Approve a preliminary Project Execution Plan (PEP). The Tailoring Strategy, if required, can be included in the PEP or placed in a separate document. (Refer to DOE G 413.3-15.)	CE or PME
• Approve appointment of the Federal Project Director considering the requirements in DOE O 361.1C.	CE or PME
• Establish and charter an Integrated Project Team to include a responsibility assignment matrix. The Charter may be included in the PEP. (Refer to DOE G 413.3-18A.)	PSO ≥ $750M FPD < $750M

Table 2.1 CD-1 Requirements[1]	
Prior to CD-1	**Approval Authority[2]**
• Develop a Risk Management Plan (RMP) and complete an initial risk assessment of a recommended alternative. This may be included in the PEP. For evaluating the Safety-in-Design Strategy, prepare Risk and Opportunity Assessments for input to the RMP. (Refer to DOE G 413.3-7A and DOE-STD-1189-2016.)	
For projects with a TPC ≥ $100M, PM will develop an Independent Cost Estimate and/or conduct an Independent Cost Review, as they deem appropriate.	
For projects with a TPC ≥ $100M, the PMRC will review and analyze the CD and make recommendations to the ESAAB, CE, or PME, as applicable, before approval.	CE ≥ $750M PME < $750M
Comply with the One-for-One Replacement legislation (excess space/offset requirement) as mandated in House Report 109-86.	
For Major System Projects, develop a Design Management Plan that establishes design maturity targets at critical milestones through final design.	
Complete a Conceptual Design.	
• Document Guiding Principles for Federal Leadership in High Performance and Sustainable Building provisions per EO 13693, Section 3(h), support for the Site or Strategic Sustainability Plan(s) per DOE O 436.1 and/or other sustainability considerations planned in the Conceptual Design Report, Acquisition Strategy, and/or PEP, as appropriate. (Refer to DOE G 413.3-6A.)	
• Conduct a Design Review of the conceptual design with reviewers external to the project.	
• ***For Hazard Category 1, 2, and 3 nuclear facilities,*** *a Code of Record shall be initiated during the conceptual design.*	
• Complete a Conceptual Design Report. Refer to Appendix C, Paragraph 8.	
Conduct an Analysis of Alternatives (AoA) that is independent of the contractor organization responsible for managing the construction or constructing the capital asset project, for projects with an estimated TPC greater than $50M. (Refer to GAO-16-22.)	PME
For Major System Projects, or first-of-a-kind engineering endeavors, conduct a Technology Readiness Assessment and develop a Technology Maturation Plan, as appropriate. At this stage, each critical technology item or system shall achieve a Technology Readiness Level-4 (TRL-4). (Refer to DOE G 413.3-4A.)	PME
Prepare a Preliminary Hazard Analysis Report (PHAR) for facilities that are below the Hazard Category 3 nuclear facility threshold as defined in 10 CFR Part 830, Subpart B.	Field Organization
Develop and implement an Integrated Safety Management Plan into management and work process planning at all levels per DOE G 450.4-1C.	
Establish a Quality Assurance Program (QAP). (Refer to 10 CFR Part 830, Subpart A, DOE O 414.1D, and DOE G 413.3-2.) ***For nuclear facilities****, the applicable national consensus standard shall be NQA-1-2008 (Edition) and NQA-1a-2009 (Addenda).*	

Table 2.1 CD-1 Requirements[1]	
Prior to CD-1	**Approval Authority[2]**
Identify general Safeguards and Security requirements for the recommended alternative. (Refer to DOE O 470.4B and DOE G 413.3-3A.)	
Complete a National Environmental Policy Act (NEPA) Strategy by issuing a determination (e.g., Environmental Assessment), as required by DOE O 451.1B. Prepare an Environmental Compliance Strategy, to include a schedule for timely acquisition of required permits and licenses.	
Update Project Data Sheet, or other funding documents for MIE and OE projects, and A-11 Business Case, if applicable. This must contain an estimate of the required amount of PED funds to execute the planning and design portion of a project (period from CD-1 to completion of the project's design). (Refer to DOE CFO Budget Call for PDS and Business Case Template.)	
Conduct a Preliminary Security Vulnerability Assessment, if necessary. (Refer to DOE O 470.4B and DOE G 413.3-3A.)	
***For Hazard Category 1, 2, and 3 nuclear facilities**, prepare a Safety Design Strategy (SDS) to guide the development of the conceptual design, with the concurrence of the CNS or with written advice of the CDNS, as appropriate, for projects subject to DOE-STD-1189-2016.*	*SBAA and FPD*
***For Hazard Category 1, 2, and 3 nuclear facilities**, conduct an Independent Project Review (IPR) to ensure early integration of safety into the design process. (Refer to DOE G 413.3-9 and DOE-STD-1189-2016.)*	*PSO*
*Prepare a Conceptual Safety Design Report (CSDR)[4] **for Hazard Category 1, 2, and 3 nuclear facilities**, including preliminary hazard analysis. For a project involving a major modification of an existing facility, the SDS must address the need for a CSDR, as well as the required PDSA. (Refer to DOE-STD-1189-2016.)*	*SBAA via the Safety Review Letter*
*Prepare a Safety Review Letter, with concurrence from the FPD, on the DOE review of the CSDR **for Hazard Category 1, 2, and 3 nuclear facilities**. (Refer to DOE-STD-1189-2016 and DOE-STD-1104-2016.)*	*SBAA*
Post CD-1 Approval	
Submit all CD documents to PM.	
Begin expenditure of PED, MIE, or OE funds for the project design.	
Develop an Acquisition Plan, if applicable.	
Continue monthly PARS II reporting (excluding earned value). FPD, Program Manager and PM will provide monthly assessments, as appropriate.	
Annually conduct project peer reviews of active projects when the top-end range is $100M or greater.	
Continue QPRs with the PME of their designee.	
***For nuclear facilities**, develop a Checkout, Testing and Commissioning Plan in preparation for acceptance and turnover of the structures, systems and components at CD-4. (Refer to DOE-STD-1189-2016.)*	

NOTES:

1. Documents and reports are not intended to be stand-alone and may be combined.
2. Where no approval authorities are noted, authorities are established through other directives or the Program Offices (e.g., Functions and Requirements Assignment Matrix).
3. Title 10 CFR Part 830 does not apply to accelerators and their operations.
4. Per 10 CFR 830.206(b), a major modification of an existing Hazard Category 1, 2 or 3 nuclear facility requires DOE approval of the nuclear safety design criteria to be used in the PDSA, unless the contractor uses the design criteria in DOE O 420.1C, *Facility Safety*. Content requirements and guidance for the SDS are specified in DOE-STD-1189-2016.

c. CD-2, Approve Performance Baseline.

(1) Completion of preliminary design is the first major milestone in the project Execution Phase. The design must be sufficiently mature (refer to Appendix C, Paragraph 7) at the time of CD-2 approval to provide reasonable assurance that the design will be implementable within the approved PB. The document signed by the CE or PME approving 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. Table 2.2 lists the requirements needed to attain CD-2.

Table 2.2 CD-2 Requirements[1]

Prior to CD-2	**Approval Authority[2]**
Approve an updated Acquisition Strategy, if there are any major changes to the acquisition approach. Obtain endorsement from PM for Major System Projects. (Refer to DOE G 413.3-13.)	PSO
Establish a Performance Baseline, reflective of identified and assessed risks and uncertainties, to include scope, TPC, CD-4 date, and minimum KPPs (if applicable). The key project milestones and completion dates shall be stated no less specific than month and year. The scope will be stated in quantity, size and other parameters that give shape and form to the project. The funding assumptions upon which the PB is predicated will be clearly documented and approved. (Refer to DOE G 413.3-5A.)	FPD
Approve updated Project Execution Plan. (Refer to DOE G 413.3-15.)	CE or PME
• Prepare a Funding Profile to support the execution of the PB and reflect in the budget document. The funding profile may be included in the PEP.	CE or PME
• Approve Long-Lead Item Procurements, if necessary. Approval may be concurrent with (or prior to) CD-2 approval. (Long-lead item procurement approval will be designated as CD-3A.)[5]	CE or PME
Develop a Project Management Plan, if applicable. (Refer to Attachment 1.)	

Table 2.2 CD-2 Requirements[1]	
Prior to CD-2	**Approval Authority[2]**
Perform a Performance Baseline External Independent Review (EIR) or an Independent Project Review (IPR). PM will conduct EIRs to validate the PB for projects with a TPC ≥ $100M. PM must issue a Performance Baseline Validation Letter to the PSO that describes the cost, schedule, and scope being validated. PMSO will conduct IPRs to validate the PB for projects with a TPC < $100M. (Refer to DOE G 413.3-9) For projects with a TPC ≥ $100M, PM will develop an Independent Cost Estimate (ICE). The ICE will support validation of the PB.	PM ≥ $100M PMSO < $100M
Complete a Preliminary and/or Final Design. ***Hazard Category 1, 2, and 3 nuclear facilities*** *shall achieve at least 90% design completion prior to CD-2 approval. Non-nuclear project designs shall be sufficiently mature to prepare a project baseline with 80-90% confidence prior to CD-2 approval. (See Appendix C, Paragraph 6a for definition of 90% design complete.)*	
• Incorporate the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings per EO 13693, Section 3(h), sustainability requirements per DOE O 436.1, and/or other sustainability considerations into the preliminary design and design review. (Refer to DOE G 413.3-6A.)	
• Conduct a Design Review of the preliminary and final designs.	
• ***For Hazard Category 1, 2, and 3 nuclear facilities,*** *design reviews should include a focus on safety and security systems. Additionally, the Code of Record shall be placed under configuration control during preliminary design. It is controlled during final design and construction with a process for reviewing and evaluating new and revised requirements. New or modified requirements are implemented if technical evaluations determine that there is a substantial increase in the overall protection of the worker, public or environment, and that the direct and indirect costs of implementation are justified in view of this increased protection.*	
• Complete a Preliminary Design Report.	
For projects with a TPC ≥ $100M, the PMRC will review and analyze the CD and make recommendations to the ESAAB, CE, or PME, as applicable, before approval.	CE ≥ $750M PME < $750M
Conduct a Project Definition Rating Index Analysis, as appropriate, for projects with a TPC ≥ $100M. PM will review as part of the EIR. (Refer to DOE G 413.3-12.)	FPD
For Major System Projects, or first-of-a-kind engineering endeavors, conduct a Technology Readiness Assessment and develop a Technology Maturation Plan, as appropriate. At this stage, each critical technology item or system shall achieve a Technology Readiness Level-7 (TRL-7). (Refer to DOE G 413.3-4A.)	PME
Employ an Earned Value Management System compliant with EIA-748C, or as required by the contract. This is performed by the contractor. (Refer to DOE G 413.3-10A.)	
Prepare a Hazard Analysis Report for facilities that are below the Hazard Category 3 nuclear facility threshold as defined in 10 CFR Part 830, Subpart B by updating the PHAR based on new hazards and design information.	Field Organization
Determine that the Quality Assurance Program is acceptable and continues to apply. (Refer to 10 CFR Part 830, Subpart A, DOE O 414.1D, and DOE G 413.3-2.)	

Table 2.2 CD-2 Requirements[1]	
Prior to CD-2	**Approval Authority[2]**
Issue the final Environmental Impact Statement or Environmental Assessment and Finding of No Significant Impact, as required by 10 CFR Part 1021. For an Environmental Impact Statement, the appropriate authority shall issue the Record of Decision after CD-2 is granted, but prior to CD-3 approval. (Refer to DOE P 451.1.)	
Update Project Data Sheet, or other funding documents for MIE and OE projects, and A-11 Business Case, if applicable. (Refer to DOE CFO Budget Call for PDS and Business Case Template.)	
For Hazard Category 1, 2, and 3 nuclear facilities, *conduct a Technical Independent Project Review (TIPR).The TIPR is required at or near the completion of the preliminary design. The TIPR is not required for non-nuclear facilities. (Refer to DOE G 413.3-9).*	*PSO*
For Hazard Category 1, 2, and 3 nuclear facilities*, update the Safety Design Strategy, with the concurrence of CNS or with written advice from CDNS, as appropriate, for projects subject to DOE-STD-1189-2016.*	*SBAA and FPD*
Prepare Preliminary Safety and Design Results[3] that update the CSDR ***for Hazard Category 1, 2, and 3 nuclear facilities*** *based on updated hazard analysis and design information. These results complete the preliminary design phase and allow for DOE review prior to completing the final design phase. (Refer to DOE-STD-1189-2016.)*	*SBAA via the Safety Review Letter*
Prepare a Safety Review Letter, with concurrence from the FPD, based on a DOE review of the Preliminary Safety and Design Results ***for Hazard Category 1, 2, and 3 nuclear facilities****. This DOE review should be scheduled as early as practicable, after contractor completion of the preliminary design, to minimize project risk. (Refer to DOE-STD-1189-2016 and DOE-STD-1104-2016.)*	*SBAA*
Prepare the Preliminary Documented Safety Analysis (PDSA)[4] for newly planned ***Hazard Category 1, 2, and 3 nuclear facilities*** *based on updated hazard analysis and design information; also for major modifications of existing facilities. (Refer to 10 CFR Part 830, Subpart B, and DOE-STD-1189-2016.)*	*SBAA via the SER*
Prepare a Safety Evaluation Report, with concurrence from the FPD, based on review of the PDSA ***for Hazard Category 1, 2, and 3 nuclear facilities****. (Refer to 10 CFR Part 830, Subpart B, and DOE-STD-1104-2016.)*	*SBAA*
Post CD-2 Approval	
Submit all CD documents, and if there are changes to the PB, submit BCP documents to PM.	
For projects with a TPC ≥ $100M, the PMRC will review and analyze the PB deviation disposition request and make recommendations to the ESAAB, CE, or PME, as applicable, before approval. The resulting BCP must also be presented to the PMRC before convening an ESAAB.	CE ≥ $750M PME < $750M
Obtain PME endorsement on any changes to the approved funding profile that negatively impacts the project.	
Continue monthly PARS II reporting (including earned value data). FPD, Program Manager and PM will provide monthly assessments.	
Continue QPRs with the PME or their designee.	

Table 2.2 CD-2 Requirements[1]	
Post CD-2 Approval	**Post CD-2 Approval**
Annually conduct project peer reviews for projects with a TPC > $100M.	

NOTES:

1. Documents and reports are not intended to be stand-alone and may be combined.
2. Where no approval authorities are noted, authorities are established through other directives or the Program Offices (e.g., Functions and Requirements Assignment Matrix).
3. Title 10 CFR Part 830 does not apply to accelerators and their operations.
4. Per 10 CFR 830.206(b), a major modification of an existing Hazard Category 1, 2 or 3 nuclear facility requires DOE approval of the nuclear safety design criteria to be used in the PDSA, unless the contractor uses the design criteria in DOE O 420.1C, *Facility Safety*. Content requirements and guidance for the SDS are specified in DOE-STD-1189-2016.
5. There are some statutory (appropriation and authorization) and/or regulatory provisions that implicate this Order. Solely for purpose of the application of appropriations and authorization laws and regulations and for any approvals under those laws and regulations, CD-3A (or CD-3X) will be treated as separate from and not within the scope of those laws and regulations as they pertain to CD-2 and CD-3. For all other purposes, from a project management perspective, CD-3A (or CD-3X) remains part of the project total scope and remains embedded in the project TPC.

(2) Optional budget request process for construction projects. Normally, funds for construction cannot be requested until CD-2 approval is obtained, or when CD-3A approval is obtained to support CD-3A scope of work. Upon PME approval, a construction project can submit a line item budget request prior to CD-2 approval, provided the PME accepts the following conditions:

- Project will document the strategy to request funds (i.e., CD-3A) prior to CD-2 approval in the AS and preliminary PEP.
- Construction funds cannot be expensed until the approval of CD-2 and CD-3, with exception of CD-3A, approval for long lead procurement, where applicable.
- CD-2 approval is obtained within two years following OMB budget submission to Congress. Typically, there are no exceptions and subsequent budget requests would not be allowed until CD-2 approval.
- If CD-2 approval is not achieved within two years following budget submission, any future budget requests for construction must be approved by the CE through the ESAAB process.
- A default original performance baseline (or TPC) will be established equivalent to the top-end range at CD-1 with the initial budget submission. At that time, a funding profile will be established and included in the PDS to support this default cost baseline.

- This original PB is refined with formal CD-2 approval and cannot exceed the top-end range established at CD-1. The project funding profile will be modified accordingly to align with the CD-2 cost baseline.

- If long lead procurement is needed upon budget submission, pursue CD-3A with the PME. (The default CD-2 performance baseline [or TPC] is the upper limit of the CD-1 cost range.)

(3) Execution typically comprises the longest and most costly phase of the project, but is only a fraction of the total life-cycle cost of a project. Value Management (VM) and VE techniques, as appropriate, should be used to ensure that the most effective life-cycle solutions are implemented. Refer to OMB Circular A-131.

d. CD-3, Approve Start of Construction/Execution.

CD-3 is a continuation of the execution phase. The project is ready to complete all construction, implementation, procurement, fabrication, acceptance and turnover activities. Table 2.3 lists the requirements needed to attain CD-3.

Table 2.3 CD-3 Requirements[1]

Prior to CD-3	**Approval Authority[2]**
Approve updated CD-2 Project Documentation that reflects major changes from Final Design, the PEP, PB, AS, and PDS/funding documents for MIE and OE funds.	CE or PME
Complete and review the Final Design for non-nuclear facilities and less than Hazard Category 3 nuclear facilities.	
• Incorporate the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings per EO 13693, Section 3(h), sustainability requirements per DOE O 436.1, and/or other sustainability considerations into the Final Design and the EIR. (Refer to DOE G 413.3-6A.)	
Employ a certified Earned Value Management System compliant with EIA-748C, or as required by the contract. (Refer to DOE G 413.3-10A.)	Certified by: PM ≥ $100M
Perform an External Independent Review by PM for Construction or Execution Readiness on all Major System Projects. (Refer to DOE G 413.3-9.) Perform an Independent Project Review by the appropriate PMSO for Non-Major System Projects unless justification is provided and a waiver is granted by the PME. For projects with a TPC ≥ $100M, PM will develop an Independent Cost Estimate.	PM ≥ $750M PMSO < $750M
For projects with a TPC ≥ $100M, the PMRC will review and analyze the CD and make recommendations to the ESAAB, CE, or PME, as appropriate, before approval.	CE ≥ $750M PME < $750M

Table 2.3 CD-3 Requirements[1]	
Prior to CD-3	**Approval Authority[2]**
For Major System Projects where a significant critical technology element modification occurs subsequent to CD-2, conduct a Technology Readiness Assessment, as appropriate. (Refer to DOE G 413.3-4A.)	PSO
Update the Hazard Analysis Report for facilities that are below the Hazard Category 3 nuclear facility threshold as defined in 10 CFR Part 830, Subpart B, based on new hazards and design information.	Field Organization
Prior to start of construction, prepare a Construction Project Safety and Health Plan[4] in accordance with 10 CFR Part 851, Appendix A, Section 1(d). This plan must be kept current during construction.	Field Organization
Update the Quality Assurance Program for construction, field design changes, and procurement activities. (Refer to 10 CFR Part 830, Subpart A, DOE O 414.1D, and DOE G 413.3-2.)	
Finalize the Security Vulnerability Assessment Report, if necessary. (Refer to DOE O 470.4B and DOE G 413.3-3A.)	
Post CD-3 Approval	
Submit all CD documents to PM.	
Commit all the resources necessary, within the funds provided and within the TPC, to execute the project.	
For projects with a TPC ≥ $100M, the PMRC will review and analyze the PB deviation disposition request and make recommendations to the ESAAB, CE, or PME, as applicable, before approval. The resulting BCP must also be presented to the PMRC before convening an ESAAB.	CE ≥ $750M PME < $750M
Within 90 days, submit Lessons Learned regarding up-front project planning and design to PSO and PM.	
Update PDS, or other funding documents for MIE and OE, and A-11 Business Case, if applicable. (Refer to DOE CFO Budget Call for PDS and Business Case Template.)	
Conduct EVMS surveillance to ensure compliance with EIA-748C, or as defined in the contract. Contractor must conduct the surveillance annually.	Conducted by: PM ≥ $100M
Continue monthly PARS II reporting (including earned value data). FPD, Program Manager and PM will provide monthly assessments.	
Continue QPRs with the PME or their designee.	
Continue annual project peer reviews for projects with a TPC > $100M.	

NOTES:

1. Documents and reports are not intended to be stand-alone and may be combined.
2. Where no approval authorities are noted, authorities are established through other directives or the Program Offices (e.g., Functions and Requirements Assignment Matrix).
3. Title 10 CFR Part 830 does not apply to accelerators and their operations.
4. For Environmental Management Clean-up Projects, refer to 29 CFR 1910.120.

e. CD-4, Approve Start of Operations or Project Completion.

CD-4 is the achievement of the project completion criteria defined in the PEP, 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. The CE or PME approves CD-4 upon notification from the project team that all project completion criteria defined in the PEP have been met. The document signed by the CE or PME 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. The date the CE or PME signs the document represents the CD-4 completion date. Table 2.4 lists the requirements needed to attain CD-4.

Table 2.4 CD-4 Requirements[1]

Prior to CD-4	**Approval Authority[2]**
Verify that Key Performance Parameters and Project Completion Criteria have been met and that mission requirements have been achieved. The FPD will verify and document the scope accomplished, TPC, KPPs met, and the completion date as it relates to the original CD-2 performance baseline and the latest approved baseline change.	FPD
Issue a Project Transition to Operations Plan[3] that clearly defines the basis for attaining initial operating capability, full operating capability, or project closeout, as applicable. The plan will include documentation, training, interfaces, and draft schedules. (Refer to DOE G 413.3-16A.)	
For non-nuclear projects, conduct a formal assessment of the project's Readiness to Operate, as appropriate. Determine the basis for DOE acceptance of the asset and if the facility or area can be occupied from both a regulatory and a work function standpoint. Establish a beneficial occupancy/utilization date for the facility and/or equipment.	
Finalize the Hazard Analysis Report for facilities that are below the Hazard Category 3 threshold as defined in 10 CFR Part 830, Subpart B.	Field Organization
Revise the Environmental Management System in accordance with DOE O 436.1, as appropriate.	
If applicable, complete and submit Contractor Evaluation Documents to the PME, the appropriate PSO, Federal procurement office, and PM in accordance with FAR 42.15.	
For projects with a TPC ≥ $100M, the PMRC will review and analyze the CD and make recommendations to the ESAAB, CE, or PME, as applicable, before approval.	CE ≥ $750M PME < $750M
Conduct an Operational Readiness Review (ORR) or Readiness Assessment (RA) ***for Hazard Category 1, 2, and 3 nuclear facilities*** *in accordance with DOE O 425.1D.*	
Prepare the Documented Safety Analysis[3] with Technical Safety Requirements ***for Hazard Category 1, 2, and 3 nuclear facilities****. (Refer to 10 CFR Part 830, Subpart B.)*	*SBAA via the SER*

Table 2.4 CD-4 Requirements[1]	
Prior to CD-4	**Approval Authority[2]**
Prepare a Safety Evaluation Report (SER) based on a review of the Documented Safety Analysis and Technical Safety Requirements ***for Hazard Category 1, 2, and 3 nuclear facilities****. (Refer to 10 CFR Part 830, Subpart B, and DOE-STD-1104-2016.)*	
For nuclear facilities, *the Code of Record must be included as part of the turnover documentation from a design and construction phase contractor to the operating phase contractor; from an operating phase contractor to the decommissioning phase contractor; and when a change in contractor occurs during any single life-cycle phase and is maintained under configuration control.(Refer to DOE-STD-1189-2016)*	
Post CD-4 Approval	
Submit all CD documents to PM.	
Finalize PARS II reporting (including reporting earned value data through completion of the PMB).	
Within 90 days, submit Lessons Learned regarding project execution and facility start-up to PSO and PM.	
Within 90 days, submit an Initial Project Closeout Report.	
NOTES: 1. Documents and reports are not intended to be stand-alone and may be combined. 2. Where no approval authorities are noted, authorities are established through other directives or the Program Offices (e.g., Functions and Requirements Assignment Matrix). 3. Title 10 CFR Part 830 does not apply to accelerators and their operations. 4. For Environmental Management Clean-up Projects, refer to 29 CFR 1910.120.	

f. Project Closeout.

After the project is complete, the next step is project closeout. Project Closeout provides a determination of the overall closure status of the project, contracts, regulatory drivers, and fiscal condition. After CD-4 approval, the project is required to complete the activities listed in Table 2.5.

Table 2.5 Project Closeout Requirements[1]	
Prior to Project Closeout	**Approval Authority[2]**
Perform final administrative and financial closeout. Prepare the final Project Closeout Report once all project costs are incurred and invoiced and all contracts are closed. The report includes final cost details as required to include claims and claims settlement strategy where appropriate. (Refer to DOE G 413.3-16A.)	
Complete and document achievement of Facility Sustainment goals (e.g., LEED Gold, LEED Silver, etc.), as applicable, via an independent third-party entity within one year of facility occupancy in accordance with EO 13693, Section 3(h), EO 13514, Section 3, and DOE O 436.1.	

Table 2.5 Project Closeout Requirements[1]	
Prior to Project Closeout	**Approval Authority[2]**
Establish and/or update the property record in the Facilities Information Management System (FIMS) for all construction of or modifications to real property. (Refer to DOE O 430.1C.)	

NOTES:

1. Documents and reports are not intended to be stand-alone and may be combined.
2. Where no approval authorities are noted, authorities are established through other directives or the Program Offices (e.g., Functions and Requirements Assignment Matrix).
3. Title 10 CFR Part 830 does not apply to accelerators and their operations.

5. Application of Requirements for Different Circumstances.

Although most DOE projects will follow the requirements outlined in this Order, there are some differing project situations where customizing the process is beneficial:

a. Environmental Management Cleanup Projects.

When the Department, Congress or a regulatory agreement transfers or formally assigns cleanup responsibilities for a parcel of land or facilities to EM for cleanup, this will serve as the basis for a "Mission Need" in support of CD-0 approval by the PME. Characterization and analysis efforts are considered operational activities and shall be conducted prior to selecting scope and performance parameters and establishing a PB. Any project costs that occur after CD-0 and prior to CD-4 approval are considered to be part of the project's TPC. Normally, CD-1/2/3 will be accomplished simultaneously, since project requirements (e.g., baseline development) and associated environmental documents (e.g., regulatory agreements) are finalized in unison.

b. Design-Build Projects.

To address potential mission impacts, aggressive risk mitigation strategies are required for close-coupled or fast-tracked design-build projects. Risk management strategies must be outlined in the RMP and at a minimum must address:

- All technical uncertainties;
- The establishment of design margins to address the unique nature of the design; and
- Increased technical oversight requirements.

The PDS must be submitted for the budget year in which the Design-Build contract is to be awarded and must include the costs of design as part of the TPC. The PSO may budget for PED funds if there is a need to develop

significant performance or technical specifications for the project. For Design-Build projects, PED funds may be used for the design of line item projects and may be used to develop a statement of work or a request for proposal; whereas, operating funds are used for MIE or OE projects.

c. Projects Requiring Long-Lead Procurement.

It may be necessary to obtain CD-3 approval early, namely CD-3A, for long-lead item procurement. When exercising long-lead procurement, the FPD must consider design maturity and the associated project risk. If the long-lead item is nuclear safety-related or nuclear safety-related equipment, safety document maturity must also be considered. A budget document, such as a PDS, should be submitted within the budget process requesting construction funds to procure long lead items or indicating the use of PED funds for long-lead procurement. This is the only instance when a CD action may be taken out of sequence (i.e., CD-3A in advance of CD-2). Activities such as site preparation work, site characterization, limited access, safety and security issues (i.e., fences) are often necessary prior to CD-3, and may be pursued as long as project documents such as a PDS requesting construction or PED funds to procure the long-lead items and funding approvals are in place. The default CD-2 performance baseline (or TPC) is the upper limit of the CD-1 cost range. This represents that project execution has started, but only for the procurement of specified long-lead items. For projects involving construction of new Hazard Category 1, 2, and 3 nuclear facilities, DOE-STD-1189-2016 provides requirements for contractor justification of long-lead procurement items. DOE-STD-1104-2016 establishes the required method for DOE review and approval of long-lead procurement items.

d. Commissioning of Capital Asset Projects for Nuclear/Chemical Process Facilities.

For projects involving nuclear/chemical processes, Program Offices shall define a capital asset project as completed (CD-4) in a PEP. The Program Office must determine if hot commissioning (i.e., introduction of radioactive material) is a condition of CD-4. Ultimately, the capital asset must have the capability to meet the end-state capacity requirements approved in the CD-2 decision by the respective PME, but not as a condition of CD-4.

e. Alternative Financing.

In some instances, Alternative Financing may be the most appropriate method to obtain use of capital assets. In these instances, it is required that CD-0 and CD-1 approval be attained so that a full evaluation of the mission need and the alternatives can be accomplished. If alternative financing is selected and approved, further compliance with this Order will not be required. At that time,

other policies, laws and regulations will apply. For further details, refer to DOE Acquisition Guide, Subchapter 70.3270 and DOE G 430.1-7.

6. Baseline Management.

a. Performance Baseline Deviation.

A performance baseline deviation occurs when the approved TPC, CD-4 completion date, or performance and scope parameters cannot be met. This includes any disaggregation of scope in an effort to establish a smaller discrete project (or projects) for the immediate or at a later date. The FPD must promptly notify management whenever project performance indicates the likelihood of a PB deviation. When a deviation occurs, the approving authority must make a specific determination whether to terminate the project or establish a new PB by requesting the FPD to submit a BCP.

Additionally, all PB deviation decisions must be reported to the CE and PM. New PBs to be established because of a deviation must be validated by PM for projects with a TPC greater than or equal to $100M and by the PMSO for projects with a TPC less than $100M. In circumstances where a PB deviation is beneficial to the project—such as a lower TPC, earlier completion date, or significant scope enhancements, a validation of the PB deviation or approval by the PSO is not required.

When the Integrated Project Team (IPT), Program Office or independent oversight offices determine the Performance Baseline scope, schedule, or cost thresholds will be breached, the Program Office is required to conduct an independent and objective root cause analysis to determine the underlying contributing causes of cost overruns, schedule delays, and performance shortcomings. The root cause analysis will be provided to the PME as part of the rebaselining process to inform the PME's decision of whether to terminate or proceed with the project. Corrective actions shall be identified and presented to the PME for action approval.

b. Performance Baseline Changes.

A performance baseline change represents an irregular event which should be avoided to the maximum extent. Table 3 identifies when a deviation must be approved by the CE. The approval by the CE does not constitute approval of individual contract changes and modifications. If a contract change is necessary, the contracting officer has exclusive authority to issue changes and modify contracts, but only if the changes or modifications comply with regulatory and statutory requirements. It is critical that the FPD and the contracting officer ensure that changes to the contract are identified, issued, administered, and managed in a timely manner over the life of the project and contract. The performance baseline change process should not be used to circumvent proper

change control management (refer to DOE G 413.3-20) and contract management. The document signed by the CE approving the BCP must clearly specify the project's revised PB, which includes the TPC, CD-4 date (month and year), scope and minimum KPPs that must be achieved at CD-4.

Table 3. Performance Baseline Change Authority

Performance Baseline Changes Requiring CE Approval	
Major System and Non-Major System Projects	
Technical	Any change in scope and/or performance that affect the ability to satisfy the mission need or are not in conformance with the current approved PEP and PDS.
OR	
Cost	Increase in excess of the lesser of $100M or 50% (cumulative) of the original CD-2 cost baseline.

In addition, the CE must endorse any reduction in funding that adversely affects the project's approved funding profile for all non-Major System Projects and previously approved CE BCP actions. PM shall be notified of these funding decrements. The CE and PM shall be notified of all:

- Schedule delays that breach the original PB by greater than 12 months; or
- Post-CD-2 projects that get terminated; or
- Capital asset projects, regardless of value, no longer able to meet the Department's objective (see Appendix A, Paragraph 1).

The Under Secretaries are the approval authorities for PB changes below CE approval level. These approval authorities may not be delegated below the PSOs. New PB or PMB approval thresholds and authorities should be documented in the PEP for project changes below the thresholds identified above. These approval levels must be incorporated into the change control process for each project. Decrements to approved PB funding profiles must be endorsed by the PME. In circumstances where a PB change is beneficial to the project, such as a lower TPC, earlier completion date, or significant scope enhancements, PB changes can be approved at lower levels as designated in the PEP.

c. Directed Changes.

Directed changes are caused by DOE policy directives (such as those that have the force and effect of law and regulation), regulatory, or statutory actions and are initiated by entities external to the Department, to include external funding

reductions. Directed change decisions are reviewed and verified by PM and OMB and follow the appropriate baseline management process.

d. Change Control.

Change control, as defined in the PEP, ensures that project changes are identified, evaluated, coordinated, controlled, reviewed, approved/disapproved, and documented in a manner that best serves the project. One key goal of change control is to ensure that PB thresholds are not exceeded. Approval authority for changes depends upon the estimated impact(s) of the change and can range from the contractor to the CE, usually with the involvement and support of a Change Control Board (CCB). The CCB membership, authorities, thresholds, and procedures should be detailed or referenced within the PEP.

e. Contract Modifications for New Performance Baseline, if Applicable.

Prior to approval of a baseline change by the PME, the FPD shall coordinate with the Contracting Officer to identify the specific contract changes that may be required, develop an Independent Government Cost Estimate (refer to FAR 36.203 and FAR 15.406-1), establish a schedule for receipt of a contractor's proposal(s), obtain audit support, and ensure the timely analysis, negotiation, and execution of contract modification(s) that comply with regulatory and statutory requirements.

f. Cancellations of Projects.

If a project is to be cancelled at any point after CD-0, the respective PME shall approve a cancellation decision and PARS II will be updated to reflect the cancellation of the project. For all post CD-2 cancellations, a formal written notification shall be issued to the Under Secretary and the Office of the Chief Financial Officer (CFO) via PM. The formal written notification shall outline the reasons for the cancellation, how the mission need will be impacted, and a disclosure of all funds expended prior to the cancellation and the costs associated with the cancellation. The CE shall be similarly notified of all post CD-2 cancellations.

7. Energy Systems Acquisition Advisory Board.

The purpose of the Energy Systems Acquisition Advisory Board (ESAAB) is to support the Department of Energy’s strategic objective of achieving and maintaining excellence in project management. The ESAAB advises the Secretary, Chief Executive for Project Management, and Departmental Project Management Executives on enterprise-wide project management policy and issues and assists the CE on critical on CD milestones for Major System Projects and PB deviation dispositions with a TPC of $750M or greater. The ESAAB will be supported by the Project Management Risk Committee (PMRC), which provides enterprise-wide project management risk assessment and expert advice.

The ESAAB will not be responsible for project implementation and execution, which remains with the CE, PME, project owner, and FPD. The authority for approving CDs for Major System Projects will continue to reside with the CE and for non-Major System Projects will continue to reside with the appropriate PME. The ESAAB's role is to provide recommendations to the CE at those CD points and to the CE and PME at any other times as needed.

The ESAAB will convene at least quarterly to review all capital asset projects with a TPC of $100M or greater, focusing in particular on projects at risk of not meeting their PBs; discuss project management and project execution across the Department; and, if applicable, provide recommendations to the CE on CD milestones for Major System Projects. The ESAAB shall meet as often as deemed necessary for the execution of the ESAAB's functions. A call for a special ESAAB can also be made when an unforeseen review of a capital asset project is required. During these quarterly meetings, the ESAAB will meet with the PMRC and be briefed by the Chair of the PMRC or others as designated by the Chair.

Based on analysis provided by the program and other project management organizations, and any additional input from the committee, the ESAAB will evaluate project scope, cost and schedule estimates, management oversight processes, technical readiness, and other issues (including organization and staffing) that may have a material bearing on a project's successful delivery. In addition to the PMRC, the ESAAB may also identify and advise on uncertainties and risk factors affecting successful project execution as well as on compliance with applicable project management policies and procedures. To support the ESAAB's efforts, the ESAAB will have access to all relevant project-related information and data, including any PMRC analyses.

The ESAAB shall advise the CE on decisions related to CD milestones, including baseline change proposals and other matters as appropriate. The ESAAB shall review Major System Projects before all CDs and baseline change proposals are presented to the CE using information and data provided by the program and other project management organizations, including the PMRC. The PMRC, the cognizant FPD, and/or others, as appropriate, will brief the ESAAB as part of each ESAAB's review of projects for CDs. The ESAAB may request additional information and analyses from other individuals and organizations with project responsibilities, including Departmental staff.

a. ESAAB Membership. The members are (including anyone acting in such capacity):

(1) Deputy Secretary, Chair

(2) Under Secretary of Energy

(3) Under Secretary for Science

(4) Under Secretary for Nuclear Security

(5) General Counsel

(6) Chief Financial Officer

(7) Chief Information Officer

(8) Senior Procurement Executive, as appropriate

(9) Executive Director, Loan Program Office

(10) Director, Office of Project Management Oversight and Assessments, Office of the Under Secretary of Energy (Secretariat)

(11) Chair of the Project Management Risk Committee

(12) The Secretary or Deputy Secretary may designate other PSOs or functional staff as ESAAB members (temporary or permanent) as needed.

The Deputy Secretary will serve as the Chair. In the event that the Deputy Secretary position is vacant, the Secretary shall designate a Chair from among the members. If the Deputy Secretary is recused from a matter involving the ESAAB or is otherwise unable to attend an ESAAB meeting, the Deputy shall designate a Chair from among the members. The Chair may elect to choose a Chair pro tempore, from among the members, to convene an ESAAB meeting to review a CD and to transmit the recommendation of the ESAAB to the Chair.

In the case of all members of the ESAAB (except the Chair), if the individual is recused from matters involving the ESAAB or is otherwise unable to attend an ESAAB meeting, or if the position is vacant, their deputy (or if applicable, their principal deputy) shall serve as an ESAAB member.

A simple majority of the ESAAB shall constitute a quorum. The ESAAB may invite other federal Departmental officials or employees to participate in meetings or supply information.

The ESAAB will document its recommendations and provide analysis prepared in support of recommendations to the CE, PME, and other officials, as appropriate. The ESAAB members will vote on all recommendations to the CE, PME, and other officials. Recommendations by the ESAAB shall be made by majority vote and the votes will be recorded in the minutes of the ESAAB meetings.

b. <u>"Paper" ESAAB: Streamlined ESAAB Process</u>.

In circumstances where the acquisition action is of relatively low monetary value, low risk, and requires non-controversial decisions (i.e., baseline deviation and CD approvals) that need CE or PME approval, a streamlined ESAAB achieves the required staff coordination and approval without convening a formal meeting of

all ESAAB members. This process should be considered, when the following parameters are met:

(1) A Program Office requests PM to consider a streamlined ESAAB in lieu of a formal ESAAB meeting;

(2) PM will determine: (1) if a streamlined ESAAB is appropriate; (2) level of inter-office coordination required; and

(3) At a minimum, all streamlined ESAABs will be coordinated with PM, CIO, CFO, and the Office of the General Counsel with the expectation of expeditious review. If issues cannot be resolved within 15 days of document submission to ESAAB members, PM will forward the issues to the Deputy Secretary for final decision.

c. ESAAB Issue Resolution.

To ensure timely decision making, if open issues cannot be resolved in 15 calendar days following an ESAAB, PM will forward the issues to the Deputy Secretary for final decision.

d. ESAAB Secretariat.

The ESAAB Secretariat resides in PM and provides administrative and analytical support and recommendations to the ESAAB. When performing the Executive Secretariat duties, the Director of PM is accountable to the Deputy Secretary. The Executive Secretariat will prepare and coordinate all briefing materials in collaboration with appropriate programs, and record and maintain all minutes of the ESAAB meetings.

e. Non-Major System Project Advisory Boards.

The designated PME will appoint an Advisory Board to provide advice and recommendations on actions for projects that are not designated as Major System Projects. The designated PME is the Chair of the Advisory Board. The Advisory Board replicates and conducts identical functions to those performed by the ESAAB. Members may be selected from within the PME's organization. However, at least one member from an office not under the PME will be designated as a contributing representative. PM will not be a Board member for projects with a TPC less than $750M, but must be invited to attend the Advisory Board meetings. The implementing documentation (including CD and BCP approval memoranda) and composition of each Advisory Board along with meeting agendas and minutes will be provided to PM.

f. Project Management Risk Committee.

The purpose of the PMRC is to support the Department of Energy's strategic objective of excellence in project management. The Committee will leverage existing capabilities to provide enterprise-wide project management risk assessment and expert advice to the Secretary, CE, PME and the ESAAB on cost, schedule and technical issues regarding capital asset projects with a TPC of $100M or greater. Upon request of the CE, PME, or ESAAB, the Committee will also address projects with a TPC less than $100M that are at risk of not meeting their performance baseline.

The Committee will not be responsible for project implementation and execution, which remains with the CE, PME, project owner, and FPD. The authority for approving CDs for Major System Projects will continue to reside with the CE and for non-Major System Projects will continue to reside with the appropriate PME. The Committee's role is to provide recommendations to the CE, PME and ESAAB at those CD points and at any other time as needed.

The Committee shall be an integral part of the ESAAB and shall advise the CE, PME and ESAAB on decisions related to CD milestones, baseline change proposals, and other matters as appropriate. They will also provide on-going monitoring and assessments of projects throughout the CD process. In addition, the Committee will review project management policies and procedures, including the implementation of this Order, for Department-wide application and provide the Secretary, CE, PME and ESAAB with expert advice. This includes assuring that clear, strong Departmental functional responsibility extends from the PME to the project owner to the FPD, and ensuring that issues are appropriately flagged and elevated early so that they may be appropriately addressed. Finally, the committee will enable the sharing of best practices and lessons learned information on a routine basis. To support the Committee's efforts, access to all project-related information and data will be made available from project assessment and data collections frameworks.

To support the committee's efforts, access to all project-related information and data will be made available from project assessment and data collections frameworks.

Project Assessments. The committee will assess, on a periodic basis, reviews that have been conducted at the Under Secretarial level, and advise the CE, PME, ESAAB and other program officials on project performance. These assessments will complement, but not duplicate or replace, the ongoing peer review processes within the Under Secretaries' organizations. The committee shall conduct more frequent and detailed assessments of higher risk projects, and provide advice and assistance to the CE, PME and ESAAB on a regular basis.

The committee will utilize project analyses conducted by the programs and other project management organizations to assess projects and advise the senior leadership on appropriate actions to address and mitigate risks associated with

project scope, cost and schedule estimates, management oversight processes, technical readiness, and other issues (including organization and staffing) that may have a material bearing on the project's successful implementation. The committee will also identify and advise on uncertainties and risk factors affecting successful project implementation as well as on compliance with applicable project management policies and procedures.

Assessment of CD proposals and Baseline Change Proposals. The committee will use information and data provided by the program and other project management organizations to review and analyze projects before all CDs and BCP are presented to the CE, PME, or ESAAB. As appropriate, the respective FPD or designated program representative (prior to CD-1) will brief the committee as part of the assessment process. The committee may request additional information and analyses from the CE, PME and other individuals with project responsibilities, including both Departmental staff and contractor managers. The committee, the respective FPD, and/or others, as appropriate, will brief the ESAAB as part of the ESAAB's review process for CDs. The committee will perform its assessments to support the CD milestone schedule established by the project owners such that the committee does not unnecessarily delay CDs if there are no issues.

The assessments may address, but are not limited to:

- Alternatives analysis to ensure that all viable options are thoroughly considered and the best alternative is recommended (CD-1)

- Scope, schedule, cost, design maturity level, and technology readiness level to ensure they are appropriate prior to establishing a project baseline (CD-2)

- Construction readiness to ensure the project is prepared to begin construction (CD-3)

- Operational readiness to make certain a project is ready to start operations (e.g., evaluating Operational Readiness Reviews) (CD-4)

Strengthening Peer Reviews. To enhance the peer review process, each Under Secretary's Office of Project Assessments will provide sufficient notice to the committee regarding upcoming peer reviews. The committee will advise on planned peer reviews, as needed, to ensure review groups are focused on pressing issues, and recommend review team members, as appropriate. The committee will evaluate results of the reviews as well as related corrective actions.

Independent Assessments. The committee may recommend to the CE, PME or ESAAB that an independent assessment of a project be conducted.

Advising Senior Leadership. The Committee will meet at least quarterly with the ESAAB to review all capital asset projects with a TPC of $100M or greater with a focus on projects at risk of not meeting their performance baselines, discuss project management across the Department, and, if applicable, provide recommendations to the ESAAB on CD milestones for projects under the Committee's purview. The Chair of the Committee or others as designated by the Chair will brief the ESAAB at the quarterly meetings. The Committee may also recommend to the Secretary, CE or ESAAB that the ESAAB review and advise on matters brought to its attention by the Committee.

Membership. The Secretary shall appoint the members of the committee. All committee members shall be federal employees who are experts in their representative fields or senior leaders with significant decision-making authorities. Standing members shall include:

(1) Associate Deputy Secretary (or other Senior Advisor designated by the Secretary)

(2) Director, Office of Project Management Oversight and Assessments, Office of the Under Secretary of Energy (Executive Secretariat)

(3) Director, Office of Project Assessment, Office of Environmental Management, Office of the Under Secretary for Science

(4) Deputy Assistant Secretary for Acquisition and Project Management, Office of Environmental Management

(5) Director, Office of Project Assessment, Office of Science

(6) Deputy Director for Science Programs, Office of Science

(7) Director, Office of Project Assessment, Office of the Under Secretary for Nuclear Security

(8) Associate Administrator for Acquisition and Project Management, Office of the Under Secretary for Nuclear Security

(9) Chief Operating Officer, Loan Programs Office or Chief Engineer, Director of Technical and Project Management, Loan Programs Office

The Secretary will appoint a Chair from among the members. The Chair may designate a Vice Chair. The Director of PM will serve as the Executive Secretariat of the PMRC. When performing those duties, the Secretariat will be accountable to the Deputy Secretary. The Executive Secretariat will prepare and coordinate all briefing materials, in collaboration with appropriate programs, and record and maintain all minutes of the committee meetings.

In the case of all members of the Committee (except the Chair), if the individual is recused from matters involving the Committee or is otherwise unable to attend a Committee meeting, or if the position is vacant, their deputy (or if applicable, their principal deputy) shall serve as a Committee member.

A simple majority shall constitute a quorum. The committee may invite other Departmental federal officials or employees to participate in meetings or supply information.

To the extent reasonable and practicable, recommendations by the Committee shall be made by consensus, although they may also be made by majority vote or, in the event there are less than three sitting member, by unanimous vote. Any dissenting votes will be noted in the minutes of the meetings. The Committee will document its recommendations and provide analysis prepared in support of its recommendations to the CE, PME, and ESAAB, as appropriate.

APPENDIX B
RESPONSIBILITIES

Three objectives regarding roles and responsibilities that are necessary to achieve defined project objectives as well as the objectives of this Order are:

- Strengthening line management accountability for successful project management results;
- Clearly defining the roles, responsibilities, authority, and accountability of the Federal Project Management Team relative to the contractor Project Management Team; and
- Developing effective IPTs to assist the FPD in planning, programming, budgeting, and successfully acquiring capital assets.

Line managers are responsible for successfully developing, executing, and managing projects within the approved PB. Delegation of authority from one line manager to a lower-level line manager must be documented and consistent with DOE delegation authorities and the qualifications of the lower-level line manager. Although the authority and responsibility for decision-making may be delegated to a lower-level manager, the senior manager remains accountable for the decisions made by subordinate managers.

Clear roles, responsibilities and accountabilities among the project's owner, line management organizational elements, and support staff organizations shall be documented in the preliminary project execution plan at CD-1 and updated during subsequent changes to the PEP.

Key roles and responsibilities of line managers are described in the following sections:

1. Deputy Secretary (Chief Executive for Project Management).

    a. Serve as the Chief Executive responsible and accountable for all project acquisitions.

    b. Exercise decision-making authority, including CDs for all Major System Projects.

    c. Ensure that the FPDs appointed for Major System Projects are qualified, experienced, and have appropriate communication skills and leadership characteristics prior to designation.

    d. Identify special interest projects and ensure senior executive-level quarterly reviews are provided for those projects.

    e. Approve disposition of projects and PB changes at the CE approval level upon PB deviations.

f. Serve as Chair for the ESAAB.

g. Approve site selection for facilities at new sites to include real estate purchases outside of the current DOE footprint.

h. Conduct quarterly project reviews for Major System Projects, which may be delegated to the Under Secretaries.

i. Approve exemptions as defined in Paragraph 3.c.(3) and (4).

2. Under Secretaries.

a. Receive PME authority from the CE, as appropriate.

b. Designate a project owner before CD-1.

c. Ensure that the FPDs appointed to Non-Major System Projects are qualified and have appropriate communication skills and leadership characteristics prior to designation.

d. Delegate PME authority, as appropriate (refer to Appendix A, Table 1).

e. Exercise decision-making authority, including CDs, functioning as the PME.

f. Hold line accountability for applicable program and capital asset project execution and implementation of policy.

g. Hold accountability for project-related site environment, safety and health, and safeguards and security.

h. Serve as Chair and appoint members for Acquisition Advisory Boards.

i. Approve disposition of projects and PB changes below CE approval level upon PB deviations (may not be delegated below Program Secretarial Officers).

j. Maintain a list of special interest projects and ensure that senior executive-level quarterly reviews are provided for those projects.

k. Establish PMSO or delegate this responsibility to the Program Secretarial Officer.

l. Address and resolve issues on projects which report to them.

m. Conduct quarterly project reviews when serving as the PME. These reviews may be delegated to the Program Secretarial Officer.

3. Program Secretarial Officers and Deputy Administrators/Associate Administrators for the NNSA.

   a. Hold line accountability for applicable capital asset project execution and implementation of policy.

   b. Hold accountability for project-related site environment, safety and health, and safeguards and security.

   c. Approve MNS documents and AS documents for all capital asset projects (cannot be delegated).

   d. Approve disposition of projects and PB changes below the CE approval level following PB deviations. If delegated, this authority cannot be further delegated.

   e. Exercise decision-making authority, including CDs, when functioning as PME.

   f. Ensure that the FPDs appointed to Non-Major System Projects are qualified and have the appropriate communication skills and leadership characteristics prior to designation.

   g. Delegate PME functions, as appropriate (refer to Appendix A, Table 1).

   h. Nominate FPDs, when the PME is above the Program Secretarial Officer, no later than CD-1 (can be delegated). The FPD appointment is subject to the approval of the PME.

   i. Approve the IPT charter for Major System Projects.

   j. Serve as Chair and appoint members for Acquisition Advisory Boards.

   k. Establish PMSO when responsibility is delegated or directed by the Under Secretaries.

   l. Explicitly address integration of safety into design and construction for Hazard Category 1, 2, and 3 nuclear facilities as a key consideration in approval of project documentation and when functioning as PME.

   m. Appoint a Safety Basis Approval Authority no later than CD-0 for projects including the design and construction of Hazard Category 1, 2, and 3 nuclear facilities or for projects including major modifications thereto.

4. Project Owner.

   a. Ensure the identification of requirements and request the necessary budget to support the mission need.

b. Visit the project site and review the progress against key milestones that were approved as part of the performance baseline.

5. Project Management Support Offices (when established).

a. Provide independent oversight and report directly to the Under Secretaries, or Program Secretarial Officer, as appropriate.

b. Serve as the Secretariat for the Program Secretarial Officer/NNSA-level Advisory Board functions.

c. Coordinate quarterly project reports.

d. Perform IPRs, TIPRs, and Project Peer Reviews as requested by the PME or Program Offices.

e. Develop Program-specific guidance, policies, and procedures.

f. Collect, analyze and disseminate lessons learned and "best practices."

g. Coordinate with other DOE organizations and offices, including PM, to ensure the effective and consistent implementation of project management policies and directives.

h. Provide assistance and oversight to line project management organizations.

i. Analyze project management execution issues.

j. Actively assist senior management on issues related to project management performance, including implementation of corrective actions.

k. Provide support to the FPDs.

l. Validate the PB for capital asset projects with a TPC less than $100M.

6. Program Managers and Heads of Field Organizations.

a. Direct initial project planning and execution roles for projects assigned by the PME.

b. Initiate definition of mission need based on input from Sites, Laboratories and Program Offices.

c. Establish the initial IPT in advance of the designation of a FPD.

d. Oversee development of project definition, technical scope and budget to support mission need.

e. Initiate development of the AS before CD-1 (during the period preceding designation of the FPD).

f. Perform functions as a PME when so delegated.

g. Develop project performance measures and monitor and evaluate project performance throughout the project.

h. Allocate resources throughout the program.

i. Oversee the project line management organization and ensure the line project teams have the necessary experience, expertise, and training in design engineering, safety and security analysis, construction, and testing.

j. Serve as the FPD until the FPD is appointed.

k. Ensure that performance measures, resource allocations, and project oversight, as applicable, address integration of safety into design and construction for Hazard Category 1, 2, and 3 nuclear facilities.

l. Review prerequisite documents (as listed in Appendix A, Tables 2.0-2.5) before each CD submission.

m. Identify which contracts should incorporate the CRD and notify the Contracting Officer to include the CRD in the contract.

7. Project Management Executives.

The following roles and responsibilities are for illustrative purposes and each designated PME is guided by the specific limits of their delegated authority (see DOE/NNSA Senior Procurement Executive for contract award and modification execution authority). There can only be one designated PME per project.

a. Approve CDs for capital asset projects including CD-2, performance baseline approval and its associated funding profile.

b. Appoint and chair Acquisition Advisory Boards to provide advice and recommendations on key project decisions.

c. Approve the appointment of the FPD. Ensure that the FPD has the appropriate qualifications, competencies, and communication and leadership skills prior to designation by interviewing the proposed FPD for each project. When the FPD is not a designated career federal civil servant (i.e., contracted project manager) or is under an Intergovernmental Personnel Act (IPA) Agreement, the CE must endorse their appointment.

d. For nuclear facilities, designate the Design Authority at CD-1.

e. Monitor the effectiveness of FPDs and their support staff.

f. Approve project changes in compliance with change control levels identified in PEPs, to include all BCPs and funding profile changes that impact the PB.

g. Conduct quarterly project reviews.

h. Explicitly address integration of safety into design and construction for Hazard Category 1, 2, and 3 nuclear facilities as a key consideration in QPRs and approval of project CDs.

i. Direct IPRs be conducted.

j. Ensure the FPD has a contracting, construction and design organization(s) that is prepared to execute the project planned.

k. Ensure the contractor has a competent manager supported by a qualified project team.

l. Ensure there is adequate skilled staff for federal oversight of the contractor.

m. Visit the project site and review the progress against key milestones that were approved as part of the performance baseline.

8. Federal Project Director.

Successful performance of DOE projects depends on professional and effective project management by the FPD. The FPD is accountable to the PME, Program Secretarial Officer or delegated authority, as appropriate, for the successful execution of the project within a PB.

The FPD's assigned project must meet cost, schedule and performance targets unless circumstances beyond the control of the project directly result in cost overruns and/or delays. FPDs must demonstrate initiative in incorporating and managing an appropriate level of risk to ensure best value for the government. In cases where significant cost overruns and/or delays may occur, the FPD must alert senior management in a timely manner and take appropriate steps to mitigate them.

Roles and responsibilities of the FPD's team must be clearly defined relative to the contractor management team. DOE Guides provide further information. These roles and responsibilities include:

a. Attain and maintain certification in concert with the requirements outlined in DOE O 361.1C before they are delegated the authority to serve as FPD and/or within one year of appointment, achieve the appropriate level of certification.

b. Serve as the single point of contact between Federal and contractor staff for all matters relating to a project and its performance.

c. Prepare and maintain the IPT Charter and operating guidance with IPT support and ensure that the IPT is properly staffed. Define and oversee the roles and responsibilities of each IPT member.

d. Appointed as the Contracting Officer's Representative, as delegated by the Contracting Officer.

e. Lead the IPT and provide broad project guidance. Delegate appropriate decision-making authority to the IPT members.

f. Approve the IPT charter for non-Major System Projects.

g. Ensure the development and implementation of key project documentation (e.g., the PEP).

h. Define project cost, schedule, performance, and scope baselines.

i. Ensure that design, construction, environmental, sustainability, safety, security, health and quality efforts performed comply with the contract, public law, regulations and EOs.

j. Ensure timely, reliable and accurate integration of contractor performance data into the project's scheduling, accounting, and performance measurement systems, to include PARS II.

k. Evaluate and verify reported progress; make projections of progress and identify trends.

l. Approve (in coordination with the Contracting Officer) changes in compliance with the approved change control process documented or referenced in the PEP.

m. Ensure that safety is fully integrated into design and construction for Hazard Category 1, 2, and 3 nuclear facilities.

n. Ensure early warning systems (triggered by thresholds) and communication channels are in place, so senior leadership is informed of potential project issues in time to make productive changes.

9. Departmental Staff and Support Offices.

Departmental Staff and Support Offices develop policy and related implementing guidance, perform review functions, and provide advice and recommendations to Department leadership. Key roles and responsibilities of these offices regarding the acquisition of capital assets follow.

10. DOE/NNSA Senior Procurement Executives.

The Senior Procurement Executive (SPE) will:

a. Execute the procurement functions and responsibilities in accordance with the Office of Federal Procurement Policy and EO 12931.

b. Serve as the principal procurement advisor to the CE, PME and the Chief Acquisition Officer.

c. Execute certain decisional authorities reserved for the SPE.

d. Exercise general procurement authority.

e. Delegate procurement authority to the Heads of Contracting Activity and Contracting Officers.

11. Contracting Officer.

The Contracting Officer is the only member of the IPT delegated authority to enter into, administer, modify, change, and/or terminate contracts. Significant responsibilities are:

a. Serve as the principal procurement advisor to the FPD.

b. Participate in the formulation of the DOE and NNSA Acquisition Strategy and Acquisition Plan.

c. Work with the IPT to develop solicitations and evaluate and award mission-oriented contracts.

d. Serve as a standing member of the CCB with sole authority to modify the contract.

e. Work with the IPT to ensure alignment between the PEP and the Contract Management Plan.

f. Assist in the development of contract cost, schedule and performance incentives.

g. Incorporate the applicable clauses, and terms and conditions in the solicitation and the contract. Ensure that the prime contractor complies with the requirements to

include subcontractor flow down requirements of this Order, FAR clauses and EVMS-related terms and conditions as identified by the FPD.

12. Office of the Associate Under Secretary for Environment, Health, Safety and Security.

a. Advise the Deputy Secretary in his/her role as the CE on environmental, safety, and security matters related to all CD approvals.

b. Serve as a member of the IPR team at the request of the CE, PSO, Program Manager, Operations/Field Office Manager or FPD.

c. Participate on EIRs, as an observer, at the request of PM.

d. Participate in safety and security documentation and QA reviews for acquisition projects at the request of PM and/or the PME when considered appropriate.

e. Participate in ORRs or RAs at the request of the line organizations.

f. Support the CTAs as requested.

13. Office of Enterprise Assessments.

Perform targeted reviews of technical processes and products associated with the design and construction of nuclear facilities.

14. Office of Project Management Oversight and Assessments.

a. Serve as DOE's principal point of contact and advisor relating to project management.

b. Develop policy, requirements and guidance for the planning and management of capital asset projects.

c. Assist in the planning, programming, budgeting and execution process for the acquisition of capital assets in coordination with the Program Secretarial Officer and PMSO.

d. Support the Office of the Secretary, Deputy Secretary, Under Secretaries and Program Secretarial Officer in the CD process; and oversee the acquisition management process.

e. Serve as a member and Executive Secretariat for the ESAAB and the PMRC. When performing the Executive Secretariat duties, the Director of PM-1 is accountable to the Deputy Secretary.

f. Manage the Project Management Career Development Program (PMCDP).

g. Establish, maintain and execute the EVMS Certification and Surveillance Review processes in accordance with established levels to ensure full compliance with applicable FAR and OMB requirements.

h. Perform EVMS Certification and Surveillance Reviews of contractors with projects that have a TPC of $100M or greater and, on an exception basis, or at the request of the PMSO, of contractors with projects that have a TPC between $50M and $100M.

i. Review MNS documents for projects with a TPC of $100M or greater.

j. Review the AS for Major System Projects.

k. Maintain a corporate project reporting capability.

l. Establish, maintain and execute a corporate EIR capability to provide an independent assessment and analysis of project planning, execution and performance.

m. Validate the PB for all capital asset projects with a TPC greater than or equal to $100M to permit inclusion in the DOE annual budget.

n. For Major System Projects, conduct an ICR prior to CD-0. For projects with a TPC of $100M or greater, develop an ICE and/or conduct an ICR prior to CD-1, develop an ICE prior to CD-2 and CD-3.

15. Integrated Project Team.

a. Support the FPD.

b. Work with the Contracting Officer to develop a project AS and AP, as applicable.

c. Ensure that project interfaces are identified, defined and managed to completion.

d. Identify, define and manage to completion the project environmental, safety, health, security, risk and QA requirements.

e. Identify and define appropriate and adequate project technical scope, schedule and cost parameters.

f. Perform periodic reviews and assessments of project performance and status against established performance parameters, baselines, milestones and deliverables.

g. Plan and participate in project reviews, audits, and appraisals as necessary.

h. Review all CD packages and recommend approval/disapproval.

i. Review and comment on project deliverables (e.g., drawings, specifications, procurement, and construction packages).

j. Review change requests, as appropriate, and support CCBs as requested.

k. Participate, as required, in ORRs or RAs.

l. Support preparation, review and approval of project completion and closeout documentation.

m. Ensure safety is effectively integrated into design and construction as applicable to each team member's respective functional area for design and construction of Hazard Category 1, 2, and 3 nuclear facilities.

16. Central Technical Authorities.

The CTAs are responsible for maintaining operational awareness, especially with respect to complex, high-hazard nuclear operations and ensuring that the Department's nuclear safety policies and requirements are implemented adequately and properly (see DOE O 410.1 for further discussion). In this context, it is important to recognize that the CTAs have responsibilities related to nuclear safety directives that apply to projects. The overall roles and responsibilities of the CTAs include:

a. Concur with the determination of the applicability of DOE directives involving nuclear safety included in contracts pursuant to 48 CFR 970.5204-2(b).

b. Concur with nuclear safety requirements included in contracts pursuant to 48 CFR 970.5204-2.

c. Concur with all exemptions to nuclear safety requirements in contracts that were added to the contract pursuant to 48 CFR 970.5204-2.

d. Recommend to the Associate Under Secretary for Environment, Health, Safety and Security issues and proposed resolutions concerning DOE safety requirements, concur in the adoption or revision of nuclear safety requirements (including supplemental requirements) and provide expectations and guidance for implementing nuclear safety requirements for use by DOE employees and contractors.

e. For DOE nuclear facilities, CTA concurrence is required on the directives included in requests for proposals for new prime contracts prior to its release and in revisions to existing prime contracts as per DOE O 410.1.

17. Chief of Defense Nuclear Safety and Chief of Nuclear Safety.

The Chiefs (and staff) are responsible for evaluating nuclear safety issues and providing expert advice to the CTAs and other senior officials (see DOE O 410.1 for further discussion). For Hazard Category 1, 2, and 3 nuclear facilities that are not regulated by the Nuclear Regulatory Commission (NRC), or as requested by the CTA or other senior officials for facilities regulated by the NRC, the Chief shall:

a. Provide support to both the CTA and PME regarding the effectiveness of efforts to integrate safety into design at each of the CDs and as requested during other project reviews.

b. Ensure that TIPRs and IPRs, as appropriate, evaluate: 1) the qualifications of IPT members having nuclear safety-related responsibilities, and 2) the effective implementation of DOE-STD-1189-2016 as applicable for design and construction of nuclear facilities.

c. For nuclear facilities, concur on the nuclear safety scope and breadth of TIPRs and IPRs. Ensure that TIPRs and IPRs evaluate the status of project planning to achieve operational readiness.

d. Advise Safety Basis Approval Authorities and concur with (CNS) or provide written advice (CDNS) prior to the approval of Safety Design Strategies and revisions thereto.

18. Project Management Governance Board.

The governance board (and staff) is responsible for evaluating project management issues and providing resolution to PMSOs and Program Managers. The responsibilities will be an additional duty to the existing PMCDP certification review board whose primary function is to certify FPDs.

a. Responsibilities:

(1) Identify issues through PM as the Secretariat.

(2) Provide interpretation or clarification of Order requirements and resolve 413-series Guide issues.

b. Membership:

(1) PM Director and NNSA Associate Administrator for Acquisition and Project Management, or designees, co-chair the board.

(2) One senior representative from each of the PMSOs to include EM, NNSA, and SC.

(3) PM Deputy Director for Project Management Oversight and Assessments.

(4) PM serves as Secretariat.

APPENDIX C
TOPICAL AREAS

1. Project Management Principles. This is the Department's framework for successful project execution:

   a. Line management accountability.

   b. Sound, disciplined, up-front project planning.

   c. Well-defined and documented project requirements.

   d. Development and implementation of sound acquisition strategies that incorporate effective risk handling mechanisms.

   e. Well-defined and managed project scope and risk-based PBs and stable funding profiles that support original cost baseline execution.

   f. Development of reliable and accurate cost estimates using appropriate cost methodologies and databases.

   g. Properly resourced and appropriately skilled project staffs.

   h. 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).

   i. Early integration of safety into the design process.

   j. Effective communication among all project stakeholders.

   k. Utilization of peer reviews throughout the life of a project to appropriately assess and make course corrections.

   l. Process to achieve operational readiness is defined early in the project for Hazard Category 1, 2, and 3 nuclear facilities.

   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.

   All projects entail risk. Generally, the larger and more complex the project, the higher the probability that the PB may be breached. By dividing larger projects into multiple smaller projects, the probability of success is generally increased as the duration, complexity and attendant risks for each project have been reduced. Where appropriate, Program Offices in coordination with the PME should consider breaking large projects

into multiple, smaller, discrete usable projects (mindful of project interfaces) that collectively meet the mission need. However, the benefits of reduced risk exposure should be balanced with the potential for increased overhead costs.

Some things to consider when breaking larger projects into multiple smaller projects prior to establishing PBs (at CD-2):

- Time Horizon: Minimize the time horizon and risk to the maximum extent possible. Ideally, execution should take no more than four (4) years starting from CD-3.

- Funding Profile: Develop each project's funding profile to support the optimum project schedule and deliver projects quickly.

- Segregate by Building or Group Similar Types of Facilities: Segregate nuclear from non-nuclear work; utility systems/buildings from general use facilities; fixed price work from cost reimbursable work.

- Phase Projects: Execute well-defined, lower-risk, complete and usable projects first, allowing additional time to advance designs on more complex and/or technical projects. Project phases should not impede one another. Refer to Appendix C, Paragraph 27.b.

- Span of Control: Ensure that the planned scope and pace of work is matched to the capacity and capabilities of the management team.

- Segregate Projects by Geographic Area: Occasionally, projects involve separate geographic locations with different site conditions, construction workforce environments, and regulatory and political pressures.

- Workforce Phasing: Phase construction and environmental remediation projects within the program to take advantage of “leap-frogging” trades (i.e., concrete workers moving from one project to the next).

A capital asset project can range from the construction of a simple facility, such as a warehouse, to a group of closely-related projects managed in a coordinated way. This effort is known as program management.

Selection and designation of a Program Manager (see Appendix B, Paragraph 6) is critical as they ensure that all their projects are properly phased, funded over time and that each project manager is meeting their key milestones. Program managers are the advocate; they ensure proper resourcing and they facilitate the execution process. A program manager is responsible for managing programmatic risks and putting mitigation strategies in place to minimize risks to projects. Programmatic risks should be identified and quantified in terms of cost and/or schedule contingency and accounted for within one or more of the projects.

With multiple smaller projects, there may be a need for additional FPDs, perhaps at lower certification levels. However, each project, regardless of size, must be led by a certified FPD. Depending on the project size, an FPD can be assigned to direct one large project and/or multiple small projects. In addition, the project organizational structure, roles and responsibilities, and chain of command should be delineated in the PEP.

2. Acquisition Strategy.

An AS is a key activity formulated by the IPT leading up to CD-1. The AS is the FPD's overall plan for satisfying the mission need in the most effective, economical and timely manner. For more details, see FAR 34.004, DOE Acquisition Guide, Chapter 7, and DOE G 413.3-13.

Supporting the execution of the AS is the procurement strategy that must be documented in writing as prescribed by FAR 7.1 and for major systems acquisition, FAR 34.004. While the AS represents a high level plan which is approved through the CD review and approval process, the information and analysis required as part of an AP, if applicable, provides greater focus on the analysis and strategies needed to appropriately execute procurements in accordance with sound business practices, statutory, regulatory and policy requirements. Typically, the AP will not be formulated until after the CD authority has selected the programmatic approach as part of CD-1. The review and approval of the AP resides within the contracting authority of the Senior Procurement Executive or their designee. Therefore, approval of the AS by the PSO cannot be presumed to constitute approval of the AP.

While the approval of the AS and the acquisition planning processes may be bifurcated, it is critical that the planning and formulation are aligned. The early formulation of an IPT (including the assignment of a contracting officer), the balance in its composition, and continuity in the membership is critical to the integration and alignment of the AS and acquisition planning processes.

If an AS includes the acquisition of real property, it must be reviewed by a certified Real Estate Specialist for regional land use impact and a real property alternative analysis must be conducted.

3. Analysis of Alternatives.

The responsible program office is required to conduct an analysis of alternatives (AoA) that is independent of the contractor organization responsible for managing the construction or constructing the capital asset project. The AoA will be conducted for projects with an estimated TPC greater than $50M prior to the approval of CD-1 and may also be conducted when a performance baseline deviation occurs or if new technologies or solutions become available. This determination will be made by the PME. The AoA will be consistent with published GAO best practices. Refer to GAO-16-22, DOE and

NNSA Project Management: Analysis of Alternatives Could Be Improved by Incorporating Best Practices.

4. Baseline Clarity.

There is only one original PB and it is documented at CD-2 approval. The PB represents the Department's commitment to Congress 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 EVMS. Refer to DOE G 413.3-10A for further clarification.

FPDs, contracting officers and program managers are accountable for ensuring contract and project documentation is complete, up-to-date, and auditable. Project baseline documentation must clearly define scope, key performance parameters, and the desired product, capability, and/or result. At project completion, there should be no question whether the objectives were achieved. Contracts and M&O work authorizations must clearly reflect project objectives and scope. Changes, especially to project objectives, need to be executed through a timely, disciplined change control process. Significant changes should be the exception, rather than the norm.

5. Cost Estimating.

The authority and accountability for any project, including its costs, must be vested firmly in the hands of the FPD. Some cost estimate, or cost range, should be provided at each CD gateway, but the degree of rigor and detail for a cost estimate should be carefully defined, depending on the degree of confidence in project scale and scope that is reasonable to expect at that stage. Whatever figure or range that is provided should explicitly note relevant caveats concerning risks and uncertainties inherent in early estimates at CD-0 and CD-1 stages given the immature requirements definition at this juncture. A project owner should never be the sole cost estimator, at any stage (i.e., from CD-0 on), given the inherent conflict of interest. The second cost estimator should come from outside of the line manager's chain of command, to avoid conflict of interest.

Established methods and best practices will be used to develop, maintain, monitor, and communicate comprehensive, well-documented, accurate, credible, and defensible cost estimates. Cost estimates shall be developed, maintained, and documented in a manner consistent with methods and the best practices identified in DOE G 413.3-21, GAO Cost Estimating and Assessment Guide (GAO-09-3SP), and, as applicable, with the Federal Acquisition Regulation (e.g., FAR Subpart 15.4 – Contract Pricing; FAR Subpart 17.6 – Management and Operating Contracts), Office of Management and Budget Circular A-11, Preparation, Submission, and Execution of the Budget, and Department of Energy Acquisition Regulation (DEAR) Subpart 915-4 – Contract Pricing.

6. Design Management.

a. Design Management for Nuclear Facilities.

Projects involving construction of new Hazard Category 1, 2, and 3 nuclear facilities intended to manage, store, process or handle nuclear materials shall comply with DOE-STD-1189-2016 and shall achieve at least 90 percent design completion before CD-2.

The objective of this requirement is to ensure systems, structures, and components, the overall design, are sufficiently mature to meet project requirements and outcomes and thus fulfilling the mission need. Design maturity at 90 percent completion will ensure that a performance baseline is based on a credible cost estimate and achievable schedule for project completion.

As a minimum, 90 percent design complete includes:

- Complete final drawings and specifications that may be released for bid and/or construction
- A current and detailed cost estimate
- A current construction schedule
- Clearly defined testing requirements and acceptance criteria for the safety and functionality of all subsystems
- Independent technical, construction, operation and environmental reviews of the final drawings and specifications
- A quality control review that evaluates both technical accuracy and discipline coordination
- A final design that meets all the requirements stipulated in the Code of Record
- A final design review that should be a final validation of comment resolution from previous reviews and a review of any additional developments since the last review
- The checking and verification of any required waivers or exemptions

The following design and safety basis documents would also need to be prepared prior to CD-2:

- Final design report

- Final design review report
- Preliminary documented safety analysis
- Safety evaluation report

b. Design Management for Non-Nuclear Construction.

Non-nuclear project designs shall be sufficiently mature to allow the PME to ensure achieving a complete, accurate project baseline with 80-90 percent confidence. At CD-1, a design plan shall establish anticipated levels of design maturity at each CD through final design. Independent project reviews should evaluate progress against the design plans established at CD-1.

In addition, for all capital asset projects greater than $100M, the Project Management Risk Committee (PMRC) will review all project design plans at CD-1 to ensure design maturity targets at critical milestones are reasonable based on numerous factors including technology readiness, complexity, total project cost, and any other relevant factor for the project. Ideally, at CD-2, the objective is to achieve a design maturity that would be used as a reliable indicator of a contractor's actual total costs at completion that would not exceed the original cost baseline.

c. Design Management Plans for Major System Projects.

To enhance fiscal insight and discipline for major system projects, an estimate of the required amount of PED funds to execute the planning and design portion of a project (period from CD-1 to completion of the project's design) shall be included in the CD-1 documentation.

As part of the development and approval process for CD-1 for major system projects, design management plans shall be developed and included in the approval package. If at any time, through forecasting or actual costs, it becomes apparent the design cost target will be breached, then the PMRC shall be notified.

7. 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.

In conducting EIRs, PM will evaluate the sufficiency of the project's design maturity. This analysis will serve as a key evaluation factor in formulating its recommendation to validate a project PB. In addition, when approving a CD, the PME should consider the sufficiency of the design maturity.

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. The Pre-Conceptual Design stage 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.

The conceptual design process 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 Department. 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. 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. At a minimum, the Conceptual Design shall develop the following:

- Scope required to satisfy the Program mission requirements;
- Project feasibility;
- Attainment of specified performance levels;
- Assessment of project risks and identification of appropriate risk handling strategies;
- Reliable cost and schedule range estimates for the alternatives considered;
- Project criteria and design parameters;
- Impact on the site Sustainability Plan; and

- Identification of requirements and features.

A Conceptual Design Report (CDR) shall be developed that includes a clear and concise description of the alternatives analyzed, the basis for the alternative selected, how the alternative meets the approved mission need, the functions and requirements that define the alternative and demonstrate the capability for success, and the facility performance requirements, planning standards and life-cycle cost assumptions. The CDR should also clearly and concisely describe the KPPs that will form the basis of the PB at CD-2. When the purpose of the project is remediation, restoration, or demolition, other forms of documenting the requirements and alternative(s) may be used.

The following are requirements for projects authorized by the annual National Defense Authorization Act (refer to 50 USC 2744 and 2746 and PL 113-66, Section 3120). These statutory requirements apply only to projects in support of a national security program of the Department.

- The Secretary shall submit a request for funds for a conceptual design for a project if the estimated cost of the conceptual design exceeds $3M.

- The conceptual design for a project shall be completed before requesting funds for a construction project.

- If the TEC for construction design for a project exceeds $1,000,000, funds for that design must be specifically authorized by law.

- Construction on a project may not be started, if the current TEC of the project exceeds by more than 25% the amount shown in the most recent PDS submitted to Congress.

The Preliminary Design stage 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 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 (as depicted in Figure 3). 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.

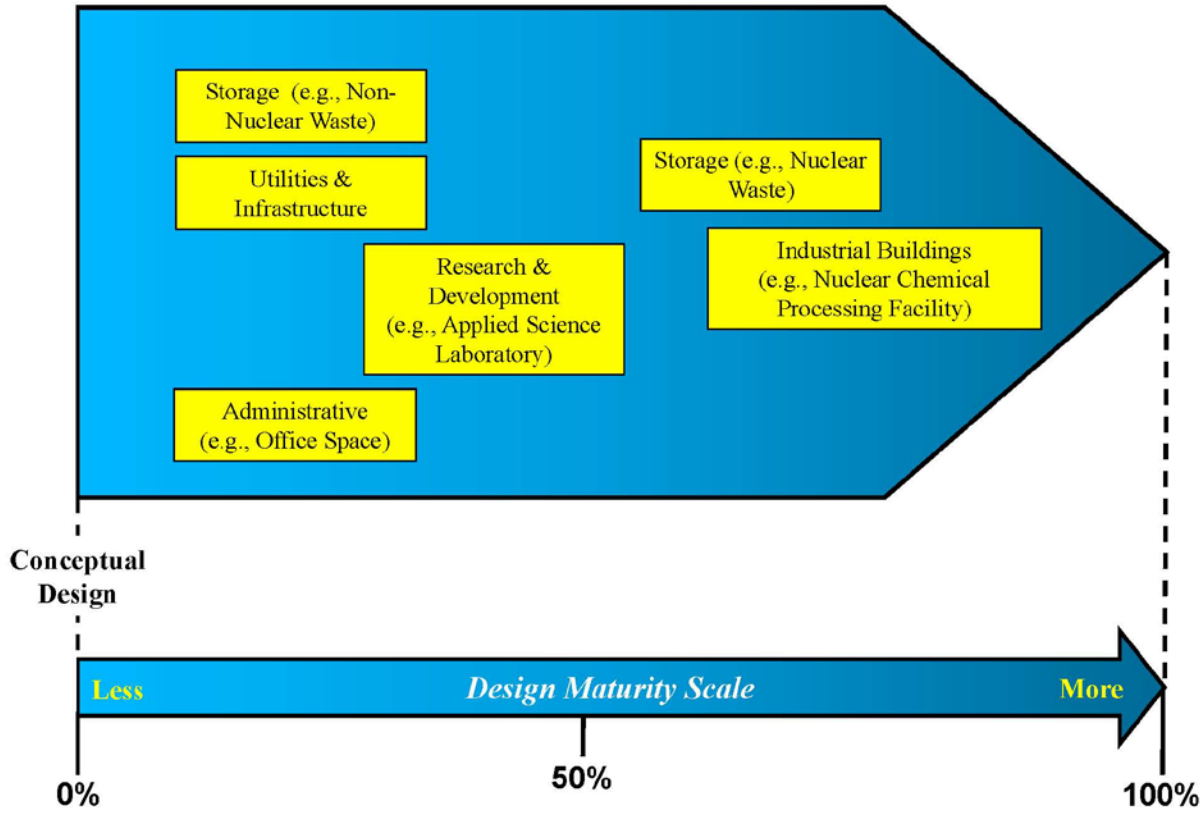


Figure 3. Facility Design Maturity General Guidelines for CD-2.

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 and CCBs) should be permitted only for compelling reasons (i.e., substantial economies achieved through 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.

Scientific systems, such as accelerators, detectors, and production and manufacturing facilities, may not follow a linear design process in which all subsystems reach the same maturity at the same time. Concurrency in these types of projects increases the risk because each subsystem design is dependent upon the design maturity of other subsystems. Projects that have several subsystems may have separate preliminary and final design stages. Consequently, final designs may be completed at various points in time in the system development process. Regardless, design reviews should be conducted

for all projects and should involve a formalized, structured approach to ensure the reviews are comprehensive, objective, professional and documented.

Design reviews (including constructability reviews, where appropriate) 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. The fundamental purpose of the design review is to ensure the following:

- Quality of the design.
- Operational and functional objectives are met.
- Maintenance of costs within the budget.
- Design is sufficient for the stage of the project, e.g., for final design, the design is biddable, constructible, and cost-effective.
- Interface compatibility.
- Final contract documents comply with the design criteria.
- A detailed, unbiased, analytical approach is given to all of the above items.

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

8. Earned Value Management System.

The Department will adopt project management control best practices equivalent to those implemented by the Department of Defense (DoD). This includes a DOE version of the DoD Integrated Program Management Report (IPMR) on projects not associated with a firm fixed-price contract.

An EVMS is required for all projects with a TPC greater than $50M. In accordance with FAR Subpart 52.234-4, a contractor's EVMS will be reviewed for compliance with EIA-748C, or as required by the contract. (Further details on establishing, employing, and maintaining a compliant EVMS are found in DOE G 413.3-10A, EIA-748C, and DOE Integrated Program Management Report (IPMR) Data Item Description (DID)).

For projects with a TPC less than $100M, the contractor may request an exemption from the PMSO from using EVMS. For firm fixed-price contracts, a contractor EVMS is not required. For projects with a TPC between $50M and $100M, if an EIA-748C compliant EVMS is not used, an alternative project control method must be approved by the PMSO.

The alternate system requirement must be described in the PEP and provided to the contracting officer to be included as a contract requirement. Alternative project control methods to be used must include at a minimum a(n) work breakdown structure, integrated master schedule showing critical path, schedule of values, account of planned versus actual work and cost, and EAC.

Only the facility construction and facility improvement activities of High Performance Computing (HPC) projects will be subject to the Earned Value Management (EVM) requirements of this Order. "Non-construction activities," which are programmatic elements of HPC activities including research and development, leases, and software development, will be subjected to the following components:

- EVM Compliance – Non-construction activities will be tracked with level of effort activities and milestone achievement and EVM compliance should be eliminated.

- PARS II Reporting – Non-construction activities will be entered with narrative information only.

Project control information will be provided monthly, including upload of the baseline and status schedules, and data from the schedule of values and planned versus actual work and cost accounts, into the Department's PARS II system in accordance with the PARS II Contractor Project Performance (CPP) Upload Requirements document.

For projects using EVMS and reporting EVMS data, the contracting officer, or the Contracting Officers' Representative (COR), normally the FPD, will ensure that contractors upload in PARS II the required project performance data at the lowest element of cost level in the specified format.

a. EVMS Certification. This is the initial determination by PM that a Contractor's EVMS is in full compliance with EIA-748C, or as required by the contract, on all applicable projects. Documentation of the certification shall be provided to the Contracting Officer and the PMSO. The Contracting Officer must provide copies of transmittal memoranda or related documents to PM. All relevant documentation shall be maintained in PARS II.

    - For contractors where there are applicable projects with a TPC between $50M and $100M, the contractor shall maintain EVMS compliant with EIA-748C.

    - For contractors where there are applicable projects having a TPC of $100M or greater, PM must conduct the certification review process and certify the contractor's EVMS compliance with EIA-748C, or as required by the contract.

b. EVMS Surveillance. This is meant to ensure that a contractor's certified EVMS remains in full compliance with EIA-748C, or as required by the contract, on all applicable projects. A surveillance review may include an assessment against some or all of the EIA-748C requirements. The extent of the surveillance review will be tailored based on current conditions.

For contractors where there are applicable projects having a TPC of $100M or greater, PM will conduct a risk-based, data driven surveillance during the tenure of the contract, during contract extensions, or as requested by the FPD, the Program, or the PME). Documentation of the surveillance will be provided to the Contracting Officer documenting the compliance status of the contractor's EVMS with EIA-748C, or as required by the contract.

(1) Notification of Non-Compliance. If following a PM surveillance review, the contractor has not fully corrected the noted deficiencies despite offers of assistance from PM, has ignored contractual direction to take corrective action, or the results of the surveillance review indicate non-compliance with EIA-748C, PM may issue a Notice of Non-Compliance with EIA-748C, or as required by the contract, to the Contracting Officer and will note whether the contractor's EVMS certification has been withdrawn.

(2) Implementation Review. An implementation review is a special type of surveillance performed at PM's discretion in lieu of a certification review when EVMS compliance is a requirement. This type of review extends the certification of a contractor's previously certified system. The implementation review must be conducted prior to CD-3 or at the latest within three months of construction mobilization. A contractor's certified system may be extended in the following situations:

- When a contractor adopts one of their existing certified EVMS for application under a new contract at the same or different site (sometimes referred to as Corporate Certification).
- From one project to another project after a period of system non-use.
- A previously certified system description to a significantly revised system description.
- From one certifying entity to another (meaning other Civilian Federal Agency or DoD to DOE) provided the contracting entity remains the same.

- When a new contractor adopts the previous contractor's existing certified system with minimal to no change in the system description, processes, or tools.

9. Environment, Safety and Health Documentation Development.

a. For projects involving Hazard Category 1, 2, or 3 nuclear facilities as defined in 10 CFR Part 830, Subpart B:

(1) Prior to CD-1, a CSDR is developed to:

- Document and establish a preliminary inventory of hazardous materials, including radioactive materials and chemicals;
- Document and establish the preliminary hazard categorization of the facility;
- Identify and analyze primary facility hazards and facility Design Basis Accidents;
- Provide an initial determination, based on preliminary hazard analysis, of safety class and safety significant structures, systems, and components;
- Include a preliminary assessment of the appropriate seismic design category for the facility itself as well as safety significant structures, systems, and components;
- Evaluate the security hazards that can impact the facility safety basis (if applicable); and
- Include a commitment to the nuclear safety design criteria of DOE O 420.1C (or proposed alternative criteria).

(2) At completion of the Preliminary Design Phase, Preliminary Safety and Design Results are developed to reflect more refined analyses based on the evolving design and safety integration activities during preliminary design. The Preliminary Safety and Design Results should include the results of process hazards analyses and confirm or adjust, as appropriate, the items included in the CSDR.

(3) Prior to CD-2, a PDSA is prepared which updates and expands the safety information in the Preliminary Safety and Design Results and identifies and justifies any changes from the design approach described in the Preliminary Safety and Design Results. A plan to achieve operational readiness is prepared using the core requirements of DOE O 425.1D.

(4) Prior to CD-4, a Documented Safety Analysis is developed based on information from the PDSA and the SER. Technical safety requirements are developed to document and establish specific parameters and requisite actions for safe facility operation.

(5) An ORR or RA will be conducted in accordance with DOE O 425.1D.

b. For projects involving facilities that are below the Hazard Category 3 threshold as defined in 10 CFR Part 830, Subpart B:

(1) Prior to CD-1, prepare a PHAR to identify and evaluate all potential hazards and establish a preliminary set of safety controls. Hazardous chemicals are analyzed in accordance with Integrated Safety Management (ISM) requirements in DOE P 450.4A, 29 CFR 1910.119, and 40 CFR Part 68.

(2) Prior to CD-2, a Hazard Analysis Report is developed by updating the PHAR to include any new or revised information on facility hazards and safety design. If the hazard characterization is below Hazard Category 3 by analysis, the SBAA should approve this analysis before CD-2.

(3) Prior to CD-3 and CD-4, hazard analysis and controls are updated in the Hazard Analysis Report.

(4) The PSO will determine what level of readiness review will be conducted.

c. All projects must comply with environmental protection requirements including NEPA documentation, 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.

d. A Construction Project Safety and Health Plan is prepared prior to construction activities per 10 CFR Part 851, Appendix A, Section 1(d).

e. EO 13514 requires that all projects divert at least 50 percent of construction and demolition materials and debris (by weight) from the non-hazardous solid waste stream.

10. Integrated Project Team.

The FPD shall organize and lead the IPT. The IPT is an essential element in DOE'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 FPD in successfully executing a project. The team size and membership may change as a project progresses from CD-0 to CD-4 to ensure that 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. Refer to DOE G 413.3-18A for further clarification.

Qualified staff (including contractors) must be available in sufficient numbers to accomplish all contract and project management functions. Project staffing requirements should be based on a variety of factors, including project size and complexity, as well as the management experience and expertise of the project staff. Programs must use a methodology to determine the appropriate project team size and required skill sets. One such algorithm is detailed in DOE G 413.3-19. Regardless of the methodology used, once the appropriate staff size has been determined, programs should plan and budget accordingly.

The FPD and the team will prepare and maintain an IPT Charter that describes:

- Membership (must include the Contracting Officer);
- Responsibilities and authority;
- Leads (as appropriate);
- Meetings;
- Reporting; and
- Operating guidance.

Nuclear safety experts on a nuclear facility project should include personnel in functional areas which relate to nuclear safety aspects of the facility. Disciplines within these functional areas can include: design disciplines (civil, structural, mechanical, electrical, instrumentation); health physics and radiological protection; safety, accident, hazard, or risk analysis; criticality safety; process chemistry; fire protection; configuration management; startup testing; conduct of operations; maintenance; operational readiness; commissioning; quality assurance. This does not preclude personnel from other disciplines providing that they have relevant and appropriate nuclear safety experience for the functional area for which they are responsible.

11. Integrated Safety Management System.

An Integrated Safety Management System (ISMS) must be in place to ensure that potential hazards are identified and appropriately addressed throughout the project (refer to DOE P 450.4A). It will be used to systematically integrate safety into management and work processes at all levels. The project management team will implement the following seven guiding principles:

a. Line management responsibility for safety;

b. Clear roles and responsibilities;

c. Competence commensurate with responsibilities;

d. Balanced priorities;

e. For Hazard Category 1, 2, and 3 nuclear facilities, the CSDR must identify safety standards and requirements to include preliminary seismic design category for the facility itself as well as safety class and significant structures, systems, and components;

f. Engineered controls tailored to the functions being designed or performed; and

g. Tailoring should be applied to a project's ISMS to enable tasks to be managed at the appropriate levels enabling those closest to the task plan to assume responsibility for planning and performance. Refer to DOE P 470.1A for more information.

12. Key Performance Parameters.

A 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. For NNSA projects, KPPs are also identified in the PRD. Additional details concerning the application of KPPs are provided in DOE G 413.3-5A.

13. 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 PM. 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 DOE users in the context of project management.

14. Nuclear Facilities: Safety Design Strategy and Code of Record.

Early in the conceptual design phase, a SDS should be developed for Hazard Category 1, 2, and 3 nuclear projects. The SDS provides preliminary information on the scope of anticipated significant hazards and the general strategy for addressing those hazards. The SDS is updated throughout subsequent project phases and should contain enough detail to guide design on overarching design criteria, establish major safety structures, systems, and components, and identify significant project risks associated with the proposed facility relative to safety.

Consistent with this Order, DOE O 420.1C, and DOE-STD-1189-2016 for nuclear facilities, adequate resources shall be provided to develop a SDS and a Code of Record early in the design phase. The Code of Record shall be maintained throughout the CD process and for the remainder of the nuclear facility's life-cycle. The Code of Record shall serve as the management tool and source for the set of requirements that are used to design, construct, operate and decommission nuclear facilities over their lifespan.

15. Performance Baseline.

The PB, as established in the PEP, defines the TPC, CD-4 completion date, performance and scope commitment to which the Department 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 contingency) and represents DOE's commitment to Congress and the OMB. The approved PB must be controlled, tracked and reported from the beginning to the end of a project to ensure consistency between the PEP, the PDS, and the Business Case (a requirement of OMB Circular A-11).

16. Planning and Scheduling.

Projects shall develop and maintain an Integrated Master Schedule (IMS). The IMS shall be developed, maintained, and documented in a manner consistent with methods and the best practices identified in the Planning and Scheduling Excellence Guide, published by the National Defense Industrial Association, and the GAO's Schedule Assessment Guide (GAO-16-89C).

17. 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 $100M or greater, as appropriate. This will be accomplished by the FPD. While not mandated, it is strongly encouraged for use by Programs for projects with a TPC less than $100M. See DOE G 413.3-12 for additional information.

18. Project Execution Plan.

The PEP is the core document for the management of a project. The FPD 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. Key elements of a PEP are provided in DOE G 413.3-15.

19. Project Funding.

a. Incremental Funding. Project budget requests should consider mitigating risks such as continuing resolutions (particularly for new starts), higher than anticipated project burn rate and affordability within the program's capital and operations budget portfolio.

b. Funding Profiles. In approving the funding profile for completing the project, PMEs 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 project's PME, who may not be the Program Budget Officer. Prior to endorsement by the PME, the CFO and PM will be notified of any proposed project funding profile changes so that the CFO can verify that the funding profile is covered within the President's budget.

c. Funding Documents. All projects, except for MIE, will provide to the CFO and the PM a project funding document (inclusive of the PDS for line item projects) that clearly delineates the budget year funding request, prior year budget requests and appropriations, and future planned budget requests. Consistent with current budget submission requirements, the PDS for line item projects will be included in the Department’s Congressional budget submission.

The project funding document (similar to PDS) for operating expense projects will be considered internal information for the CFO, PM, and appropriate senior leaders during the budget preparation process to document that project funds are being requested consistent with the funding profile established at CD-2, or the latest BCP that was approved.

d. Project Engineering and Design (PED) Funds. To enhance fiscal insight and discipline for major system projects, an estimate of the required amount of PED funds to execute the planning and design portion of a project (period from CD-1 to completion of the project’s design) shall be included in the CD-1 documentation.

For projects where the top-end range is less than $100M, the use of PED funds shall be limited to a two-year duration, unless approved by the PME. The PMRC shall be notified of granted time extensions or waivers. The estimate will be subject to applicable independent reviews.

e. Align Priorities to Program Appropriations. Each program office shall develop an integrated capital asset project priority list as a corporate tool to enable DOE leadership to optimize limited budget resources. The priority list shall be updated

at least annually and should rank mission needs that are achieved by each capital asset project and identify project drivers, internal and external factors for ranking the projects. The prioritization should be reflected in the annual fiscal guidance.

20. Project Reporting, Assessments and Progress Reviews.

a. Project Reporting. PARS II is the central repository for key Departmental-level project information. PARS II enables receipt of cost and schedule data in the format specified in the DOE version of the IPMR to ensure consistency across the federal government and deploy improved cost and schedule analysis tools. Contractor will upload in PARS II the required project performance data at the lowest element of cost level in the specified format.

The Program Offices and FPDs will ensure that project data is uploaded monthly into PARS II (including EVMS data provided directly into PARS II from contractor's systems after CD-2). Approval of CD-0 initiates a requirement for project status reporting. This reporting continues through completion of the PMB for all projects with a TPC greater than $50M. The PSO will submit key project documentation such as CD and BCP approval memoranda to PM within five business days of document approval.

At CD-2 and continuing through completion of the PMB, projects with a TPC greater than $50M must report project performance in PARS II no later than the last workday of every month. The data must be current as of the closing of the previous month’s accounting period.

The information and earned value data in PARS II must accurately reflect current project status and provide acceptable forecasts to facilitate project management and decision-making processes. Accordingly:

- The FPD must assure project cost and schedule performance reflects reality. Early warning indicators are essential. Monthly estimates at completion (EACs) are a must, including a separate EAC, or forecasted TPC, provided by the FPD.

- The contractor must be held accountable for providing timely, accurate, reliable and actionable project and contractor cost, schedule, performance, risk, and forecast data, reports and information. The IPT must be accountable for its oversight and validation of the data.

- Contracts should be structured so as to minimize cost overrun exposure. When significant PB cost BCPs occur that generate a new TPC, the FPD and contracting officer shall work together to consider a revised cost share proposition moving forward. In addition, the FPD and contracting officer shall work together to ensure the contracts include appropriate requirements for complete, accurate and timely reporting with appropriate

requirements analysis to support the contractor's monthly estimates of project completion cost and schedule.

b. Project Assessments. Following the upload of a contractor's monthly performance data, the FPDs have until the third business day of the following month to accomplish their assessment. The Program Managers have until the sixth business day and PM until the ninth business day to provide their assessment and to compile the monthly project status report. PM will coordinate the report with the Programs and on the 25th business day, forward the report to the Deputy Secretary.

Project performance assessments shall be determined through quantitative and qualitative methods. Elements to be reviewed include, but are not limited to EVMS data, contractor's monthly reports, acquisition management practices, risk management status, EIR/IPR/TIPR/Project Peer Reviews, site visits, staffing assessments, budget submittals, as well as discussions with the IPT members. PM will provide project assessments for all capital asset projects in its monthly reports to the Deputy Secretary. 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 by the PME or is not being executed within the AS and PEP.

c. Project Progress Reviews. QPRs must be conducted with the applicable PME or their designee. Participation by the PME is strongly encouraged at all QPRs. However, when it is not possible, the PME can delegate the review. In no case should it be delegated beyond two consecutive quarters for projects post CD-2. The CE may delegate QPRs for Major System Projects to the Under Secretaries. PM must be provided all QPR reports and invited to participate in QPRs for all projects with a TPC greater than or equal to $100M. Also, PM will serve as Secretariat for CE QPRs.

21. Project Scope.

Capital asset project scope determinations shall adhere to Federal statutes, regulations, policy, and guidance. Specifically, determinations shall comply with the Office of Management and Budget's Circular A-11 and associated Capital Programming Guide. Capital asset project decisions shall be made based on clearly defined scope and the nature and type of work to be completed and shall include all the project-specific work scope needed to achieve a complete and usable asset and accomplish the defined mission need using proper project segmentation or project phasing. The cost of

operational activities that occur solely to support accomplishment of the capital asset project between CD-0 and CD-4 are to be included in the project's TPC. Refer to DOE WBS Handbook.

22. Quality Assurance.

Quality Assurance begins at project inception and continues through all phases of the project. The FPD is responsible for a Quality Assurance Program (QAP) for the project and all applicable QA requirements must be addressed. Apply ASME NQA-1-2008 (Edition) and NQA-1a-2009 (Addenda) for Hazard Category 1, 2, or 3 nuclear facilities. The key elements of a QAP are provided in DOE O 414.1D and 10 CFR Part 830, Subpart A. (See also DOE G 413.3-2.)

23. 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 CD or phase. Refer to DOE G 413.3-9 for more information. The following is a summary of key reviews organized by CD.

a. Prior to CD-0.

(1) Mission Validation Independent Review.

A Mission Validation Independent Review, performed by the PSO, is a limited review prior to CD-0 for Major System Projects. It validates the mission need and the ROM cost range that is provided, in part, to properly designate the appropriate PME. A Value Study may also be conducted, as appropriate, to assist in CD-0. Refer to DOE G 413.3-17.

(2) Mission Need Statement Document Review.

PM will review the MNS Document and provide a recommendation to the PSO for projects with a TPC greater than or equal to $100M. The review shall be completed within 10 days after the submission for Non-Major System Projects and within 25 days for Major System Projects.

(3) Independent Cost Review.

For Major System Projects, or for projects as designated by the CE, PM will conduct an ICR. This review validates the basis of the ROM cost range and provides an assessment of whether the range reasonably bounds the alternatives to be analyzed in the next project phase. It also determines the PME authority designation.

b. Prior to CD-1.

(1) Acquisition Strategy Review.

Acquisition Strategies for Major System Projects must be sent to the ESAAB Secretariat for review by PM prior to scheduling CD-1 decisional briefings. The FPD and CO must concur with the AS prior to the PM review. Within 10 days upon receipt, PM will provide a recommendation to the appropriate PSO who holds approval authority. Approval of the AS does not constitute approval of the AP. The AP must be submitted for review and approval in accordance with established procurement procedures including DOE Acquisition Guide, Chapter 7.1.

(2) Independent Project Review.

For Hazard Category 1, 2, and 3 nuclear facilities, the PSO will conduct an IPR to ensure early integration of safety into the design process. The review must: 1) ensure that safety documentation is complete, accurate and reliable for entry into the next phase of the project; 2) evaluate whether the preferred alternative process and facility design, and corresponding safety analyses, are sufficiently detailed to identify any safety controls that, because of cost, maintainability, complexity or other limiting characteristics, could significantly impact the decision to select the preferred alternative; and 3) validate that the IPT charter has identified appropriate functions, roles and responsibilities for members needed to support nuclear safety, and that the IPT members supporting nuclear safety are appropriately qualified, and have the availability to meet their responsibilities. The PSO approval of IPRs, specified in Appendix A, Table 2.1 means that the Program Office and FPD jointly request the review, establish the review scope and schedule, and select a team leader.

CNS or CDNS concurrence, as appropriate, is required for reviews of projects that must implement DOE-STD-1189-2016. The team leader is the approval authority for the review plan (including the Criteria and Review Approach Documents) and for the final review report.

(3) Conceptual Design Review.

Conceptual Design Review must be conducted for all projects and involve reviewers external to the project using a formalized, structured approach to ensure that the reviews are comprehensive, objective and documented.

(4) Technology Readiness Assessment.

For Major System Projects or first-of-a-kind engineering endeavors, the IPT shall complete a TRA and Technology Maturation Plan, as appropriate. These assessments are also encouraged for lower cost projects where new technologies may exist.

(5) Independent Cost Estimate and/or Independent Cost Review.

For projects with a TPC greater than or equal to $100M, PM will develop an ICE and/or conduct an ICR, as they deem appropriate. This review validates the basis of the preliminary cost range for reasonableness and executability. It also includes a full accounting of life cycle costs to support the alternative selection process and budgetary decisions.

c. Prior to CD-2.

(1) DOE Review of Preliminary Safety and Design Results.

For Hazard Category 1, 2, and 3 nuclear facilities, DOE conducts an independent review of the Preliminary Design and Safety Results to determine whether final design should proceed. The review may consist of a single review or a series of reviews, based on when the preliminary design of the facility (or of defined segments of the design) is complete and ready to enter final design. This review is conducted by a DOE-selected team of experts and its results provided to the FPD for review and action as necessary. The size and composition of the team reflects the size and complexity of the project. More than one review may be conducted at the discretion of the FPD; the SDS should define segments when more than one review is planned. The independent review(s) should be scheduled as early as practicable, after completion of preliminary design, to minimize project risk. This review may be handled by the TIPR, as long as the appropriate experts are part of the review team. Refer to DOE-STD-1104-2016 for the required method for DOE personnel to review and approve the Preliminary Design and Safety Results.

(2) Technical Independent Project Review.

For Hazard Category 1, 2, and 3 nuclear facilities, a TIPR will be performed to ensure that safety is effectively integrated into design and construction. The TIPR must: 1) ensure that safety documentation is complete, accurate and reliable for entry into the next phase of the project; and 2) evaluate the IPT to ensure that appropriate team member functions to support nuclear safety during final design have been established, and appropriately qualified team members have been selected and have needed availability to address nuclear safety-related matters during final design. Completion of the TIPR is required at or near the completion of preliminary design, and prior to the start of any subsequent reviews

(including EIRs) and is required prior to CD-2 approval. The PSO approval of TIPRs, specified in Appendix A, Table 2.2 means that the Program Office and FPD jointly request the review, establish the review scope and schedule, and select a team leader.

CNS or CDNS concurrence in CD-2 approval is required for reviews of projects that must implement DOE-STD-1189-2016. The team leader is the approval authority for the review plan (including the Criteria and Review Approach Documents) and for the final review report.

(3) Performance Baseline Validation Review.

A Performance Baseline Validation Review is required to provide reasonable assurance that the project can be successfully executed. IPRs are required to validate the PB for projects with a TPC less than $100M. The PME may request an EIR in lieu of an IPR through PM, and shall do so if the PME has no PMSO to perform the review. For all projects with a TPC greater than or equal to $100M, PM will conduct an EIR and develop an ICE in support of the PB validation. Findings resulting from project reviews must be addressed by the IPT in their corrective action plan and expeditiously resolved. Follow-up reviews to validate finding resolution may be required at the discretion of the reviewing entity.

(4) Project Definition Rating Index Analysis.

For projects with a TPC greater than $100M, the FPD shall conduct a PDRI Analysis. Such analyses are also encouraged for projects with a TPC less than $100M.

(5) Technology Readiness Assessment.

For Major System Projects or first-of-a-kind engineering endeavors, the IPT shall complete a TRA and Technology Maturation Plan, as appropriate. These assessments are also encouraged for lower cost projects where new technologies may exist.

(6) Preliminary Design Review.

Preliminary Design Review must be conducted for all projects and involve reviewers external to the project using a formalized, structured approach to ensure that the reviews are comprehensive, objective and documented.

(7) Final Design Review.

Final design review must be conducted for all Hazard Category 1, 2, and 3 nuclear facilities and involve reviewers external to the project using a formalized, structured approach to ensure that the reviews are comprehensive, objective and documented.

d. Prior to CD-3.

(1) Construction or Execution Readiness Review.

An EIR must be performed by PM on Major System Projects to verify construction or execution readiness.

(2) Independent Cost Estimate.

For projects with a TPC greater than or equal to $100M, PM will develop an ICE.

(3) EVMS Certification Review.

For contracts where there are applicable projects with a TPC greater than $100M, PM must conduct the certification review.

(4) Technology Readiness Assessment.

For Major System Projects where a significant critical technology element modification occurs subsequent to CD-2, conduct a TRA, as appropriate.

(5) Final Design Review.

Final Design Review must be conducted for all non-nuclear facilities and less than Hazard Category 3 nuclear facilities and involve reviewers external to the project using a formalized, structured approach to ensure that the reviews are comprehensive, objective and documented.

e. Prior to CD-4.

(1) Operational Readiness Review or Readiness Assessment.

Conduct an ORR or RA for Hazard Category 1, 2, and 3 nuclear facilities in accordance with DOE O 425.1D.

(2) Readiness to Operate Assessment.

For non-nuclear projects, conduct a formal assessment of the project's readiness to operate, as appropriate. Determine the basis for DOE acceptance of the asset and if the facility or area can be occupied from both

a regulatory and work function standpoint. Establish a beneficial occupancy/utilization date for the facility and/or equipment.

f. Project Peer Reviews.

These focused, in-depth reviews are conducted by non-advocates (Federal and M&O or other contractor experts) and support the design and development of a project. For projects $100M or greater (or lower as deemed appropriate by the Under Secretaries), Project Assessment Offices that have direct line of responsibility to the appropriate Under Secretary shall conduct a Project Peer Review between CD-0 and CD-1, annually between CD-1 and CD-2, at least annually between CD-2 and CD-4 and more frequently for the most complex projects or those experiencing performance challenges. The reviews should be performed by peers (with relevant experience and expertise) independent of the project, to evaluate technical, managerial, cost, scope and other aspects of the project, as appropriate. Each Under Secretary shall ensure that the peer reviews have independence from line management and, to the greatest extent possible, use experts who are familiar with the projects to ensure continuity for future reviews.

The review teams will be established with the Department's most talented project, contract and technical staff from across the complex. This includes both Federal and contractor personnel from within and across Program Offices, which will benefit from this cross-fertilization by learning from each other.

There should be no contractual or budgetary impediments to accomplishing these reviews, which are fundamental to the professional development of each and every member of both the project team and the review team. The knowledge and lessons learned that our project management professional's gain with each review is invaluable. Project management professional development and departmental knowledge management is the ultimate result; enhancements to project execution performance over time is the by-product. Indirect accounts at the contributing sites should cover these allowable costs.

24. 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 at least quarterly.

Risks and their associated confidence levels are dependent on multiple factors such as complexity, technology readiness and strength of the IPT. Risks for all capital asset projects should be analyzed using a range of 70-90% confidence level upon baselining at CD-2 and reflected in funded contingency, budgetary requests and funding profiles. If a

project has a PB change, FPDs should consider reanalyzing the risks at a higher confidence level and then reflecting this in budgetary requests and funding profiles. Additional risk management information is provided in DOE G 413.3-7A.

25. Safeguards and Security.

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.

Prior to CD-1, 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.

Prior to CD-3, a final Security Vulnerability Assessment Report should be issued 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.

26. Site Development Planning.

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

27. Tailoring.

a. General.

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 PME. In the Tailoring Strategy or the PEP, the FPD 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 AS for an entire group of projects. Tailoring may also include adjusting the scope of IPRs and EIRs, delegation of acquisition authority and other elements. Major tailored elements such as consolidating or phasing CDs or delegation of PMEs should be specified in the PEP or the Tailoring Strategy.

Tailoring does not apply to nuclear safety requirements, which use a "graded approach" as prescribed in 10 CFR Part 830, *Nuclear Safety Management*. Details on developing a tailoring approach that could be applied are provided in DOE G 413.3-15.

b. Phasing.

Generally, a CD would not be split and CD-2 is never split. For some projects, it may be appropriate to phase the work (into smaller, related, complete and useable projects) and split or phase the CD. In those instances, it may be appropriate to garner CD-0 and CD-1 approvals for all the smaller projects collectively and simultaneously. Subsequently, each smaller project must have its own distinct performance baseline (CD-2) with clearly defined and documented technical scope, cost, schedule and funding profile including consideration for all applicable contingencies. See Figure 4.

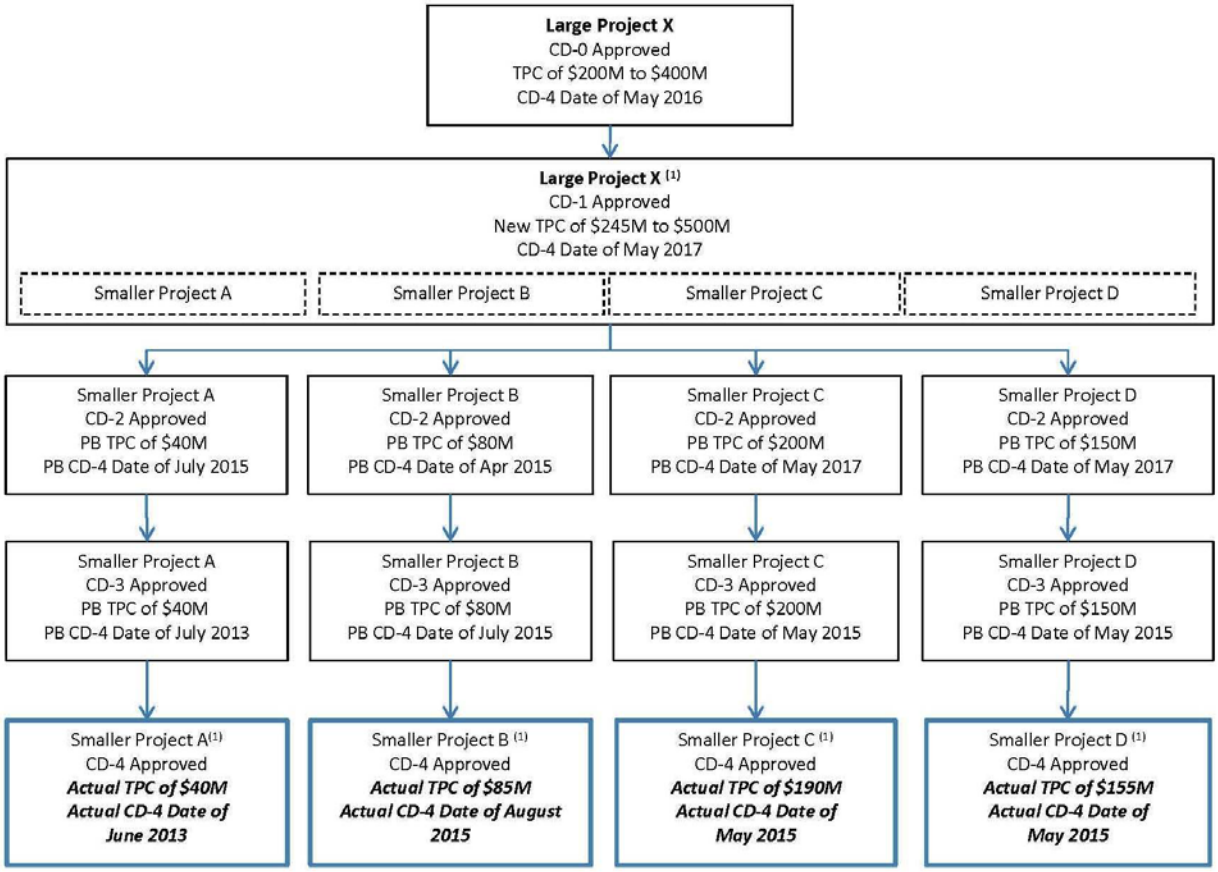


Figure 4. Phasing of a Large Project

As each smaller project achieves CD-2, its cost baseline (or TPC) gets reflected as point estimates but the TPC of the large project is a collective total of the smaller projects with the expectation that it is less than the CD-1 high end range. After each phased CD-2 is approved, the earned value for each smaller project individually must be reported into PARS II monthly if greater than $50M. When a smaller project is developed, the subsequent CDs will be approved by a PME commensurate with that project's TPC.

Although funded contingency is included as part of each smaller project's TPC, during execution, it may be held at the large project level and utilized as risks are realized. Contingency becomes part of the smaller project or an activity after the approval of the baseline change request to utilize contingency. Cost savings from one small project can be returned to the contingency pool for other small projects covered by the same PDS. These additional contingency funds can be applied toward another small project, if necessary. The large project (aggregated) CD-2 value is finally established when the last small project achieves CD-2 approval. At that time, the large project's CD-2 value equals the total value of each of the

original CD-2 values for each of the smaller projects combined. The project success metrics are based on the execution of each of the small projects.

For construction projects that collectively support one mission need, it would be advisable to include each project on one PDS to achieve maximum funding flexibility. Examples #1 through #4 outline how a time-phased, multiple-project PDS can be developed.

Example #1: Initial Budget Request for PED funds:

	Construction Cost ($M)		PED Cost ($M)				
	CD-0 or CD-1 (TPC Cost Range)	TPC	FY11	FY12	FY13	FY14	FY15
Project A	20-50	-	5	-	-	-	-
Project B	50-100	-	10	-	-	-	-
Project C	100-200	-	10	10	-	-	-
Project D	75-150	-	-	15	-	-	-
TOTAL	245-500	-	25	25	-	-	-

Example #2: Initial Budget Request for Construction, Project A (with CD-2 approval) and Project B (absent of CD-2):

	Construction Cost ($M)						
	CD-0 or CD-1 (TPC Cost Range)	TPC	FY11	FY12	FY13	FY14	FY15
Project A	-	40	-	-	40	-	-
Project B	50-100	100	-	-	10	50	40
Project C	100-200	-	-	-	-	-	-
Project D	75-150	-	-	-	-	-	-
TOTAL	-	140	0	0	50	50	40

Example #3: Initial Budget Request for Construction, Project A & B (with CD-2 approval) and Project C & D (absent of CD-2):

	Construction Cost ($M)						
	CD-0 or CD-1 (TPC Cost Range)	TPC	FY11	FY12	FY13	FY14	FY15
Project A	-	40	-	-	40	-	-
Project B	-	80	-	-	10	50	20
Project C	100-200	200	-	-	-	100	100
Project D	75-150	150	-	-	-	25	125
TOTAL	-	470	0	0	50	175	245

Example #4: Initial Budget Request for Construction (all projects with CD-2 approval):

	Construction Cost ($M)						
	CD-0 or CD-1 (TPC Cost Range)	TPC	FY11	FY12	FY13	FY14	FY15
Project A	-	40	-	-	40	-	-
Project B	-	80	-	-	10	50	20
Project C	-	200	-	-	-	100	100
Project D	-	140	-	-	-	25	115
TOTAL	-	460	0	0	50	175	235

Likewise, it may be appropriate to split CD-4. For example, "CD-4A" to designate beneficial occupancy of a facility in advance of operations start-up, particularly if there is a significant time lapse.

c. Environmental Management Cleanup Projects.

Environmental Management (EM) Cleanup Projects are frequently the antithesis of construction projects in that EM is deactivating, decommissioning, remediating, stabilizing and disposing (also known as Environmental Restoration) versus constructing. These projects are conducted under a variety of regulatory processes and site-specific cleanup agreements which are legally binding and specify the process, end states, decision points and approvals required. The TRAs plays an important role in determining the solution. For these projects, the performance and scope parameters and start/end dates are based on negotiated terms with Federal and/or State regulatory agencies. As a result of this variability, it is not possible to draw a single crosswalk to the traditional construction project that would be applicable to all EM Cleanup Projects. Hence, a tailored approach is necessary for each project. As such, the FPD will submit a Tailoring Strategy, which may be included in the PEP, to the PME for approval. See DOE G 413.3-15 for additional guidance.

d. Design-Build.

Design-Build is a project delivery method whereby a single contract is awarded for both design and construction. Design-Build is normally used most successfully with projects that have well-defined requirements with limited complexity and risks. Example projects include road building, administrative facilities and/or replication of previously accomplished projects. The nuclear safety requirements of this Order will be fully implemented for defense nuclear facilities.

(1) The Design-Build approach requires the development of a functional design and clearly stated operating requirements that provide sufficient information to allow prospective contractors to prepare bids or proposals. It also allows the flexibility to implement innovative design and

construction approaches, VE, and other cost and time savings initiatives. The overall objective of the Design-Build approach is to:

- Enhance efficiencies in project design integration into construction execution;
- Reduce the total cost to the Department; and
- Deliver projects faster than by using the traditional Design-Bid-Build approach.

(2) Since the requirements are well-defined early in the process and much of the cost and schedule information and key design criteria are known, CD-1, CD-2 and/or even CD-3 may be accomplished simultaneously. Essentially, in requesting a simultaneous approval, CD-1/2, CD-1/2/3 or CD-2/3, the IPT is asserting that:

- There is no advantage to the Department of further evaluation of alternatives;
- The project functions and requirements are well known; and
- A cost and schedule baseline can be established.

e. Long-Lead Procurement.

CD-3A may be needed for long-lead item procurement. While there is potential risk in procuring equipment before the design is complete, the potential schedule improvement may be significant and more than compensate for the risk. If the long-lead item is nuclear safety-related or nuclear safety-related equipment, safety document maturity must also be considered (refer to DOE-STD-1189-2016 and DOE-STD-1104-2016). Procurement of vendor engineering designs, for example, greatly reduces the risk of incomplete or incorrect final designs that would otherwise require rework and potentially impact cost and schedule. The need to phase CD-3 should not be confused with minor, early activities that are necessary and generally performed prior to CD-3. Activities such as site preparation work, site characterization, limited access, and safety and security issues (i.e., fences) are often necessary prior to CD-3, and may be pursued as long as project documents such as a PDS requesting construction or PED funds to procure the long-lead items and funding approvals are in place. If CD-3A is anticipated, the need for this decision and the process should be documented in the PEP or Tailoring Strategy.

28. 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.

Major System Projects, or first-of-a-kind engineering endeavors, must be assessed prior to each CD using the Technology Readiness Assessment and should achieve the following minimum Technology Readiness Level (TRL) scores for each critical technology item or system as determined by an independent review team outside of the project team before that CD can be approved. The higher the TRL at CD-2, the lower the risk to the project. The PME must provide justification to the ESAAB, if pursuing a TRL less than 7, at CD-2, which in turn will notify the CE. The following represents the minimum TRL at each CD:

- CD-1: TRL 4
- CD-2: TRL 7

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. It is strongly encouraged for use by the PME for projects with a TPC less than $750M. See DOE G 413.3-4A for additional information.

CONTRACTOR REQUIREMENTS DOCUMENT
DOE O 413.3B, PROGRAM AND PROJECT MANAGEMENT
FOR THE ACQUISITION OF CAPITAL ASSETS

This Contractor Requirements Document (CRD) sets forth requirements applicable to the contract to which this CRD is inserted. The Contractor is responsible for performing program and project management of Department-owned or -leased facilities as determined by the Federal Project Director and Contracting Officer, in conjunction with the Federally-assigned Integrated Project Team members. The Contractor shall: (1) comply with the requirements of this CRD to include subcontractor(s), and (2) flow down the appropriate requirements of the CRD to a subcontractor, when the total project cost to the prime contractor are greater than $50 million.

The Contractor's project management system shall satisfy the following requirements:

1. Except for firm fixed-price contracts, the Contractor shall:

- Employ an Earned Value Management System (EVMS) prior to Critical Decision (CD)-2, or upon contract award, for projects greater than $50 million, unless granted an exemption from the PMSO. The system shall be compliant with EIA-748C (or as required by the contract) in accordance with contract clause FAR Subpart 52.234-4, EVMS.

- Maintain an EVMS compliant with EIA-748C when there are applicable projects with a TPC between $50M and $100M.

- Receive certification of EVMS compliance with EIA-748C from PM when there are applicable projects having a TPC of $100M or greater. PM must conduct the certification review process and certify the contractor's EVMS compliance with EIA-748C, or as required by the contract.

- Receive continued surveillance of EVMS compliance with EIA-748C when there are applicable projects having a TPC of $100M or greater. PM will conduct a risk-based, data-driven surveillance during the tenure of the contract, during contract extensions, or as requested by the FPD, the Program, or the PME. Documentation of the surveillance will be provided to the Contracting Officer documenting the compliance status of the contractor's EVMS with EIA-748C, or as required by the contract.

- Provide access to all pertinent records and data requested by the contracting officer, PM, or other duly authorized representative as necessary to permit Government surveillance to insure EVMS complies, and continues to comply, with EIA-748C.

- Submit a request for an Over-Target Baseline (OTB) or Over-Target Schedule (OTS) to the contracting officer, when indicated by performance. The request shall include a top-level projection of cost (known as an estimate at completion)

and/or schedule growth (known as an Integrated Master Schedule), a determination of whether or not performance variances will be retained, and the schedule for the implementation of the rebaselining. Refer to DOE G 413.3-20.

2. For projects with a TPC less than $100M, the contractor may request an exemption from using EVMS. For firm fixed-price contracts, a contractor EVMS is not required. If contractor requests and an EVMS waiver is approved by the PMSO, the contractor will:

   - Use an alternative project control method approved by the PMSO.
   - Describe the alternate project control system in detail to the contracting officer.
   - Ensure the system provides adequate insight to potential risks to DOE relating to achievement of cost, schedule, and technical performance objectives.
   - Ensure the alternate project control methods include at a minimum a(n) work breakdown structure, integrated master schedule showing critical path, schedule of values, account of planned versus actual work and cost, and EAC.
   - Beginning no later than three months following CD-2, upload project control information monthly, including upload of the baseline and status schedules, and data from the schedule of values and planned versus actual work and cost accounts, into the Department's PARS II system in accordance with the PARS II Contractor Project Performance (CPP) Upload Requirements document.

3. The Contractor shall submit monthly project performance data beginning no later than three months following CD-2 for projects having a total project cost greater than $50 million.

   a. For projects executed under a cost reimbursement contract and required to use an EVMS compliant with EIA-748C, or as specified in the contract, the required project performance data must be uploaded into PARS II at the lowest element of cost level in the specified format. This includes:

      - Earned value data consistent with EIA-748C (or as required by the contract);
      - Time-phased incremental budget, and performance in cost and quantity;
      - Management reserve;
      - Integrated Master Schedule (both baseline and status);
      - Variance analysis;
      - Risk management data; and
      - Formal submission of all DOE Integrated Program Management Report (IPMR) formats to the contracting officer and uploaded in PARS II.

b. For a project or a portion of a project being accomplished under a cost reimbursement contract where EVMS requirements have been waived and an alternate project control system adopted, project performance data will be provided monthly into PARS II in accord with PARS II Contractor Project Performance (CPP) Upload Requirements document, and will include:

- Baseline and status schedules;
- Schedule of values data;
- Planned versus actual work and control account data;
- Variance analysis;
- Risk management data; and
- Estimate at Completion (EAC) data.

c. Under a firm fixed-price construction contract, EVM is not mandated by the Government. However, it is not discouraged, if used by a contractor to manage its projects as a standard business practice. Unlike a cost reimbursement contract, firm fixed-price contracts are not subject to adjustment on the basis of the contractor's cost experience in performing the contract. Management of firm fixed-price construction projects are accomplished through establishment of performance milestones, schedules, and percentage of project completion. For construction contracts, FAR Subpart 52.232-5, Payment[s] Under Fixed-Price Construction Contracts, governs payment and the data that the contractor must provide to support its estimate of work accomplished. Substantiation includes an itemization of the amounts requested, related to the various elements of work required by the contract covered by the payment requested and a listing of the amount included for work performed by each subcontractor under the contract, the total amount of each subcontract under the contract, and amounts previously paid to each subcontractor under the contract. While firm fixed-price construction projects cannot require the regular submission of cost data as with a cost reimbursement contract, successful project and contract execution is highly dependent on well-defined requirements that serve as the foundation upon which performance milestones are developed, accomplished, and evaluated.

d. Except for firm fixed-price contracts, the data shall be submitted by the prime contractor electronically by uploading the required project performance data at the lowest element of cost level in the specified format into the Project Assessment and Reporting System (PARS II) in accordance with the "Contractor Project Performance Upload Requirements" document maintained by the Office of Project Management Oversight and Assessments (PM). Unless PM has granted a temporary exemption, all requested data shall be submitted timely and accurately. Data shall be loaded into PARS II no later than the last workday of every month. This data shall be current as of the close of the previous month's accounting

period. Ad hoc or periodic reporting by the contractor may be required earlier than CD-2 as specified in the contract.

4. For project contracts to be awarded as subcontracts by the Contractor, the Contractor shall develop a written Acquisition Plan, if applicable. The Acquisition Plan shall receive the Contracting Officer's concurrence.

5. Technical performance analyses and corrective action plans shall be reported to DOE for variances to the project baseline objectives resulting from design reviews, component and system tests and simulations.

6. An Integrated Master Schedule (both resource loaded and with critical path) must be developed and maintained for the project. As a minimum, a resource-loaded IMS must contain labor, material and equipment costs to include unit prices and quantities. For firm fixed-price contracts, the total contract cost must be included in the integrated master schedule.

7. Project technical, cost and schedule risks must be identified, quantified and mitigated throughout the life of the project. A Risk Management Plan (RMP) will be developed to cover processes and procedures that will be implemented to address risk assessment (qualitative and quantitative), risk monitoring, risk reporting and lessons learned. The contractor's RMP must receive concurrence from DOE in accordance with contract requirements.

8. The approved integrated contractor technical, cost and schedule baseline shall be maintained using appropriate change control processes (e.g., Change Control Board) as defined in the Project Execution Plan (PEP).

9. A configuration management process must be established that controls changes to the physical configuration of project facilities, structures, systems and components in compliance with ANSI/EIA-649B and DOE-STD-1073-2016. This process must also ensure that the configuration is in agreement with the performance objectives identified in the technical baseline and the approved quality assurance plan.

10. A Value Management/Engineering (VM/VE) process shall be used. Annually, contractors shall submit a progress report identifying VE accomplishments to the Program Offices. Refer to OMB Circular A-131, 48 CFR 52.248-1, ASTM E1699-10, and 41 USC 1711.

11. A Quality Assurance Program must be developed and implemented for the contract scope of work in accordance with DOE O 414.1D, Attachment 2 (CRD), as applicable, and 10 CFR Part 830, Subpart A. For nuclear-related activities, the applicable national consensus standard shall be ASME NQA-1-2008 (Edition) and NQA-1a-2009 (Addenda).

12. An Integrated Safety Management System must be developed and implemented for the contract scope of work when the contractor is complying with the requirements of

48 CFR 970.5223-1, *Integration of Environment, Safety and Health into Work Planning and Execution*.

13. Contractors performing design for projects shall, at a minimum, conduct a Conceptual, Preliminary and Final Design Review, in accordance with the PEP. For nuclear projects, the design review will include a focus on safety and security systems. A Code of Record shall be maintained under configuration control throughout the CD process and for the remainder of the nuclear facility's life-cycle.

14. For projects involving construction of new Hazard Category 1, 2, and 3 nuclear facilities, or include major modifications thereto (as defined in 10 CFR Part 830), the requirements in DOE-STD-1189-2016 shall be fully implemented. The following documents must be submitted, as applicable: Safety Design Strategy (CD-1), Conceptual Safety Design Report (CD-1), Preliminary Safety and Design Results (CD-2), Preliminary Documented Safety Analysis (CD-2), and Documented Safety Analysis with Technical Safety Requirements (CD-4).

15. The Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings cited in EO 13693, Section 3(h), must be applied to the siting, design, construction, and commissioning of new facilities and major renovations of existing facilities.

16. At a minimum, all new construction and major building renovations must meet U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Gold certification absent an approved waiver from the PME. Refer to DOE Order 436.1.

17. For non-M&O contracts, the Contractor shall develop a Project Management Plan (PMP) that supports and complements the Federal PEP and its contract. The PMP shall describe the management methods, organization, control systems and documentation for the project. The PMP shall receive the concurrences of the FPD and the DOE Contracting Officer. If significant changes occur during the project, the PMP shall be revised by the Contractor at the direction of the Contracting Officer.

DEFINITIONS

1. 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.

2. 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.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. CD-0, Approve Mission Need. Approval of CD-0 formally establishes a project and begins the process of conceptual planning and design used to develop alternative concepts and functional requirements. Additionally, CD-0 approval allows the Program to request PED funds for use in preliminary design, final design and baseline development.

10. CD-1, Approve Alternative Selection and Cost Range. CD-1 approval marks the completion of the project Definition Phase and the conceptual design. Approval of CD-1 provides the authorization to begin the project Execution Phase and allows PED funds to be used.

11. CD-2, Approve Performance Baseline. CD-2 approval marks the approval of the performance baseline and requires the completion of preliminary design for all projects. It also requires the completion of final design for Hazard Category 1, 2, and 3 nuclear facilities. It is the first major milestone in the project Execution Phase. Approval of CD-2 authorizes submission of a budget request for the TPC.

12. CD-3, Approve Start of Construction. CD-3 provides authorization to complete all procurement and construction and/or implementation activities and initiate all acceptance and turnover activities. Approval of CD-3 authorizes the project to commit all the resources necessary, within the funds provided, to execute the project.

13. CD-4, Approve Start of Operations or Project Completion. CD-4 approval marks the achievement of the completion criteria (i.e., KPPs) defined in the PEP (or in the PRD, for NNSA projects), and if applicable, subsequent approval of transition to operations.

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

15. Code of Record. A set of design and operational requirements, including Federal and state laws in effect at the time a facility or item of equipment was designed and accepted by DOE. It is (i) initiated during the conceptual design phase, placed under configuration control to ensure it is updated to include more detailed design requirements as they are developed during preliminary design, (ii) controlled during final design and construction with a process for reviewing and evaluating new and revised requirements to determine their impact on project safety, cost and schedule before a decision is taken to revise the Code of Record, and (iii) maintained and controlled through facility decommissioning. The Code of Record may be defined in contracts, Standards or Requirements

Identification Documents (or their equivalent), or project-specific documents. [DOE-STD-1189-2016]

16. 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.

17. 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.

18. 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.

19. 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.

20. Contractor Requirements Document. The DOE document that identifies the requirements that the prime contractor's project management system must satisfy (Attachment 1).

21. 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 Federal personnel as delineated in the PEP.

22. 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.

23. Critical Decision. A formal determination made by the CE or PME at a specific point during the project that allows the project to proceed to the next phase or CD.

24. 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.

25. 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.

26. 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.

27. 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.

28. Demolition. Destruction and removal of physical facilities or systems.

29. Design Authority (for nuclear facilities only). The engineer designated by the PME 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.

30. Design-Bid-Build. A project delivery method whereby design and construction are separate contracts.

31. 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 this Order for effective performance measurement of the subcontractors' scope of work.

32. 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.

33. 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.

34. 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.

35. 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.

36. 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.

37. 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 430.1C provides implementation guidance for requirements specific to the disposition and long-term stewardship of contaminated, excess facilities.

38. 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.

39. 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.

40. 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.

41. 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.

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

43. EVMS Surveillance. The process of reviewing a Contractor's certified EVMS, on all applicable projects, to establish continuing compliance with EIA-748C, 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.

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

45. 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.

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

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

48. 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. For those directives listed in Attachment 1 of DOE O 410.1, CTA concurrences are required prior to the granting of exemptions.

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

50. Facilities Information Management System. The Department'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 430.1C for additional information.

51. 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.

52. Federal Project Director. The individual certified under the Department's PMCDP as responsible and accountable to the PME 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.

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

54. 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.

55. General Plant Project. Miscellaneous minor 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, construction, additions, and/or improvements to land, buildings, replacements or additions to roads, and general area improvements. (Refer to 50 USC 2743)

56. 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.

57. 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.

58. 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.

59. 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.

60. 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 15.404-1.)

61. 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.

62. Integrated Project Team. A cross-functional group of individuals organized for the specific purpose of delivering a project to an external or internal customer. It is led by a Federal Project Director.

63. 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.

64. 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.

65. 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.

66. 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.

67. Line Item. A distinct design, construction, betterment and/or fabrication of real property for which Congress will be requested to authorize and appropriate specific funds. A full-scale test asset or other pilot/prototype asset primarily constructed for experimental or demonstration purposes, but planned to become DOE property and continue to operate beyond the experimental or demonstration phase is included in this definition.

68. 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 PME, outside of the CD process.

69. Major Item of Equipment. Capital equipment with a cost that exceeds $2M. In most cases, capital equipment is installed with no construction cost. However, in cases where the equipment requires provision of supporting construction such as

foundations, utilities, structural modifications, and/or additions to a building, the associated construction activities must be acquired through a line item construction project or a minor construction project if the cost is below the minor construction threshold established by Congress.

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

71. 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.

72. 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.

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

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

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

76. 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.

77. 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.

78. 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 fee and contingency) and represents DOE's commitment to Congress.

79. Performance Measurement Baseline. The baseline cost that encompasses all contractor project work packages and planning packages, derived from summing all the costs from the Work Breakdown Structure. 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.

80. 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.

81. 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.

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

83. 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).

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

85. 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.

86. 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 Departmental budget.

87. 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.

88. 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.

89. 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.

90. Project Management. Those services provided to DOE 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.

91. Project Management Plan. The contractor-prepared document that sets forth the plans, organization and systems that the contractor 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.

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

93. 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.

94. Quality Assurance. All those actions performed by the DOE prime contractor during the project that provide confidence that quality is achieved. It is executed through a formalized Quality Assurance Program.

95. 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.

96. Readiness Assessment. An assessment to determine a facility's readiness to startup or restart when an 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.

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

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

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

100. 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.

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

102. 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%.

103. 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.

104. 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.

105. 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.

106. 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.

107. Technical Independent Project Review. An independent project review conducted at or near the completion of preliminary design, and is required prior to CD-2 approval, 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.

108. 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.

109. 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.

110. 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.

111. 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.

112. 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.

113. 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.

114. 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.

115. 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.

116. 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.

117. 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.

ACRONYMS

ANSI	American National Standards Institute
AoA	Analysis of Alternatives
AP	Acquisition Plan
AS	Acquisition Strategy
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
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
CE	Chief Executive for Project Management
CFO	Office of the Chief Financial Officer
CFR	Code of Federal Regulations
CNS	Chief of Nuclear Safety
CO	Contracting Officer
CPARS	Contractor Performance Assessment Reporting System
CPP	Contractor Project Performance
CRD	Contractor Requirements Document
CSDR	Conceptual Safety Design Report
CTA	Central Technical Authority
DEAR	Department of Energy Acquisition Regulation
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DID	Data Item Description
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
EVM	Earned Value Management
EVMS	Earned Value Management System
FAR	Federal Acquisition Regulation
FDO	Fee Determining Official
FPD	Federal Project Director
FIMS	Facility Information Management System
FR	Federal Register
FY	Fiscal Year
G	Guide
GAO	U.S. Government Accountability Office
GPP	General Plant Project
HPC	High Performance Computing
ICE	Independent Cost Estimate
ICR	Independent Cost Review
IMP	Integrated Master Plan
IMS	Integrated Master Schedule
IPA	Intergovernmental Personnel Act
IPMR	Integrated Program Management Report
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
LOE	Level of Effort
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
OMB	Office of Management and Budget
OPC	Other Project Costs
ORR	Operational Readiness Review
OTB	Over-Target Baseline
OTS	Over-Target Schedule
P	Policy
PARS	Project Assessment and Reporting System
PASEG	Planning and Scheduling Excellence Guide
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
PM	Office of Project Management Oversight and Assessments
PMB	Performance Measurement Baseline
PMCDP	Project Management Career Development Program
PME	Project Management Executive
PMRC	Project Management Risk Committee
PMSO	Project Management Support Office
PRD	Program Requirements Document
PSO	Program Secretarial Officer
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
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
UFGS	Unified Facilities Guide Specification
USC	United States Code
VE	Value Engineering
VM	Value Management
WBS	Work Breakdown Structure

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