DOE - EM - SRP - 2010
2nd Edition

Environmental Management

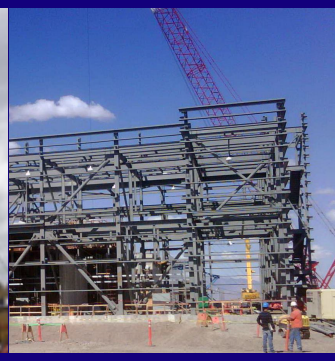
Safety ▪ Performance ▪ Cleanup ▪ Closure

Standard Review Plan (SRP)

Construction Readiness Review Module







Corporate Critical Decision (CD) Review and Approval Framework Associated with Nuclear Facility Capital and Major Construction Projects

March 2010

Office of Environmental Management
U.S. Department of Energy
Washington D. C. 20585

OFFICE OF ENVIRONMENTAL MANAGEMENT

Standard Review Plan (SRP)

Construction Readiness

Review Module

Critical Decision (CD) Applicability					
CD-0	**CD-1**	**CD-2**	**CD-3**	**CD-4**	**Post Operation**
			✓		

March 2010

[This Review Module was used to develop the Review Plan for Salt Waste Processing Facility (SWPF) Construction Readiness Review (CRR). This Review Module contains the lessons learned from the SWPF Construction Readiness Review.]

FOREWORD

The Standard Review Plan (SRP)[1] provides a consistent, predictable corporate review framework to ensure that issues and risks that could challenge the success of Office of Environmental Management (EM) projects are identified early and addressed proactively. The internal EM project review process encompasses key milestones established by DOE O 413.3A, Change 1, *Program and Project Management for the Acquisition of Capital Assets*, DOE-STD-1189-2008, *Integration of Safety into the Design Process*, and EM's internal business management practices.

The SRP follows the Critical Decision (CD) process and consists of a series of Review Modules that address key functional areas of project management, engineering and design, safety, environment, security, and quality assurance, grouped by each specific CD phase.

This Review Module provides the starting point for a set of corporate Performance Expectations and Criteria. Review teams are expected to build on these and develop additional project-specific Lines of Inquiry, as needed. The criteria and the review process are intended to be used on an ongoing basis during the appropriate CD phase to ensure that issues are identified and resolved.

[1] *The entire EM SRP and individual Review Modules can be accessed on EM website at http://www.em.doe.gov/Pages/Safety.aspx , or on EM's internet Portal at https://edoe.doe.gov/portal/server.pt Please see under /Programmatic Folder/Project Management Subfolder.*

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ACRONYMS

ANSI	American National Standard Institute
CAP	Corrective Action Plan
CD-(N)	Critical Decision (Number)
CEP	Construction Execution Plan
CRADS	Criteria Review and Approach Documents
CRR	Construction Readiness Review
DOE	Department of Energy
EM	Office of Environmental Management
EIR	External Independent Review
EVMS	Earned Value Management System
FRAM	Functions, Responsibilities, and Authorities Manual
IPR	Independent Project Review
MS	Major System
OECM	Office of Engineering and Construction Management
PEP	Project Execution Plan

PSO	Program Secretarial Officer
QA	Quality Assurance
QC	Quality Control
SRP	Standard Review Plan
STR	Subcontract Technical Representative (individual tasked to manage subcontractor activities)

I. INTRODUCTION

The authorization to proceed with construction of a new facility is given at the CD-3 phase of the project management cycle, after completion of the final design. Between CD-3 and CD-4 stages of the project, procurement and construction and/or assembly of facility structures, systems and equipment is conducted. These activities can present significant hazards to workers and involve a complex set of events that must be carefully planned and sequenced.

In preparation for the CD-3 approval, the Federal Project Director must ensure that the contractor is ready to proceed with construction. This involves verification that management systems are in place, adequate planning is conducted, procedures and training is completed, and construction hazards are adequately evaluated and controlled. These activities should be accomplished through a formal Construction Readiness Review (CRR) that supports the DOE O 413.3A process.

II. PURPOSE OF THE REVIEW MODULE

The objectives of this review module are to augment the stated objectives of the DOE Order O 413.3A for projects pending Critical Decision 3. Those being:

- "To assess the readiness for construction or execution and to confirm the completeness and accuracy of the Performance Baseline. The Scope of review for an EIR in support of CD-3 has several elements relative to construction readiness, but retains many of the elements contained in the Performance Baseline Review."
- Provide a review team with a set of topical areas and subject-specific considerations from which they may be able to develop specific construction and construction management oriented performance objectives and criteria in pursuit of a comprehensive assessment of the project's readiness to commence major procurement and construction activities.
- Provide DOE-EM with a standard template on which can be built construction assessments which will enhance the probability of success of major capital line-item projects which are commencing the most intense and vulnerable phase of execution (CD-3).
- Augment the DOE O 413.3A EIR/IPR/Program review process with construction-specific assessment perspectives typically not pursued in the reconfirmation of CD-2/Baseline related technical, budgetary and schedule assessments.

These guidelines are not intended to replace or conflict with the Construction/Execution Readiness Review conducted by the Office of Engineering and Construction Management for Major System Projects. Rather the EM guidelines are intended as a preliminary step to this process that focus on key management and technical aspects related to construction organizations, procedures and training. These guidelines may be utilized in the conduct of reviews of project construction and procurement readiness as deemed necessary by the acquisition authority or other EM authority requesting such a review.

III. ROLES AND RESPONSIBILITIES

A critical element of construction/procurement readiness reviews is the qualifications, training and most importantly the experience of the personnel selected to conduct the review. To the maximum extent possible, the personnel selected to participate in the reviews should have "on the ground", first hand experience (as opposed to an oversight role) in project or construction management or functional support of a successful line item engineering design and construction project executed under DOE O 413.3A.

The core review team personnel should include individuals possessing qualification and experience in the following areas:

- Project Management
- Construction Management
- Contracts and Procurement
- Safety Assurance (Facility and Construction)
- Quality Assurance
- Field Superintendents (Discipline-Specific Subcontract Technical Representatives-STRs)
- Project Controls
- Project Administrative Services
- Material Management

This core team should be augmented with technical personnel selected to complement the specific technical concerns of the project being reviewed. (e.g. Chemical, Structural, Seismic, Instrument, Process, Mechanical Engineering, etc.)

The structure and roles and responsibilities of the individual review team members and all others involved in the Construction Readiness Review (CRR) must be clear and consistent with the requirements of DOE O 413.3A and the DOE Functions Responsibilities and Authorities Manual (FRAM). The table below provides a compilation of construction readiness review roles and responsibilities.

Position	Responsibility
Field Element Manager	Provides support and resources to the Federal Project Director and Review Team Leader in carrying out the CRR
	Facilitates the conduct of the CRR. Assigns office space, computer equipment, and support personnel to the team as necessary to accomplish the review in the scheduled time frame
Federal Project Director	Coordinates with the Review Team Leader in the selection of technical areas for the review and in developing the review criteria.
	In conjunction with the Contractor Project Manager, develops the briefing materials and schedule for the review activities.
	Coordinates the review team pre-visit activities and follows up review team requests for personnel to interview or material to review.
	Coordinates the necessary training and orientation activities to enable the review team members to access the facility and perform the review.
	Unless other personnel are assigned, acts as the site liaison with the review team. Tracks the status of requests for additional information.

Position	Responsibility
	Coordinates the Federal site staff factual accuracy review of the draft report.
	Leads the development of the corrective action plan if required. Tracks the corrective actions resulting from the review.
Review Team Leader	In coordination with the Federal Project Director and the Acquisition Executive, selects the areas to be reviewed.
	Based on the project complexity and hazards involved, selects the members of the review team.
	Verifies the qualifications: technical knowledge; process knowledge; facility specific information; and independence of the Team Members.
	Leads the design review pre-visit.
	Leads the review team in completing the Review Criteria for the various areas to be reviewed.
	Coordinates the development of and forwards to the Federal Project Director, the data call of documents, briefings, interviews, and presentations needed for the review.
	Forwards the final review plan to the Acquisition Executive for approval.
	Leads the on-site portion of the review.
	Ensures the review team members complete and document their portions of the review. Coordinates the characterization of the significance of the findings.
	Coordinates the review team handling of factual accuracy comments by Federal and Contractor personnel on the draft report.
	Forwards the final review report to the Acquisition Executive for approval.
	Remains available as necessary to participate in the closure verification of the findings from the review report.
Review Team Member	Refines and finalizes the criteria for the appropriate area of the review.
	Develops and provides the data call of documents, briefings, interviews, and presentations needed for his/her area of the review.
	Completes training and orientation activities necessary for the review. Conducts any necessary pre visit document review.
	Participates in the on-site review activities, conducts interviews, document reviews, walk downs, and observations as necessary.
	Based on the criteria and review approaches in the Review Plan, assesses whether his/her assigned criteria have been met.
	Documents the results of the review for his/her areas. Prepares the review report.
	Makes recommendations to the Review Team Leader for characterization of findings in his/her area of review.
	Resolves applicable Federal and Contractor factual accuracy comments on the draft review report.
	Prepares the final review report for his/her area of review.
	Concurs in the findings for his/her area of the review.

IV. REVIEW SCOPE AND CRITERIA

The scope of the review module is focused on key management and technical aspects of construction organizations, training and procedures. Since the review is focused on the readiness

to proceed, it is not intended as an inspection guide for assessing implementation of construction practices or procurements during construction. The performance of these activities should be evaluated during routine oversight activities throughout the construction process.

This review module provides the review team with a "straw-man" template from which they may derive and pursue lines of inquiry that are applicable to the specific type of facility being constructed. The scope of the CRR is captured by review criteria that are presented in several broad categories. For each category, Appendix A of this Module provides overall performance objectives and then a subset of review criteria that satisfy each performance objective. These performance objectives and review criteria will provide consistent guidance to project-specific design review teams to develop their Lines of Inquiry.

Management Systems

This area of the review is focused on aspects the management systems, organization and staffing for the execution of the construction project. It is expected that key construction positions are established, related organizational roles and responsibilities are clear, and project staff are sufficiently staffed to oversee construction activities. Additionally, management systems should be in place to monitor performance against the project baseline.

Construction Procedures

This area of the review is focused on the contractor and key sub-contractor procedures used for the completion of the facility construction. It is expected that the procedures address the key elements and requirements to safely complete construction activities in accordance with applicable regulations and DOE requirements

Materials Management

This review area focuses on the materials management process for the construction activities, including the acquisition of materials, their delivery, packaging and waste management from materials receipt.

Safety Assurance

The construction contractor's capability to manage a safe project is verified in this review area. Key requirements related to integrated safety management systems, and specific plans and procedures related to industrial safety and industrial hygiene are evaluated. It is also verified that the contractor has completed a project safety and health plan as required by 10 CFR 851.

Project Controls

This review area focuses on the adequacy and health of project controls relied on to ensure adherence to the Performance Baseline and the systems or processes relied on for controlling any field changes to procedures or other project documents.

Construction Execution Plan

While the overall focus of the review module is on construction readiness, this particular review area is concerned with specific construction activities and practices, as well as the personnel and procedures in place to accomplish the work. Included are criteria related to general construction topics such as site preparation and work sequencing.

Training and Qualifications

This review area focuses on the training of qualifications of personnel responsible for construction activities. This review encompasses both the general training required for site access and the specific training and qualifications necessary for performing the planned construction activities.

Work Planning

This review area will assess the work planning to ensure that work processes are controlled by approved instructions, procedures, design documents, technical standards or hazard controls as appropriate for the task to be performed. This area also evaluates the organization of work and whether systems are in place and mature to support development of work packages or processes.

Constructability

This review area focuses on the project constructability. The key elements include the design specifications, drawings, site conditions and the construction schedule including the order of construction elements and potential impacts.

Field Engineering

The review area of field engineering is concerned with the readiness of activities explicit to construction of specific facility systems in accordance with their approved design, as well as ensuring feedback from field observations that may impact design. This area consists of mechanical, electrical, instrumentation, civil, and piping.

Welding

This review area focuses on the requirements, procedures and controls applicable to ensure that welding performed meets the design specifications and criteria, and can be performed safely by the construction forces.

Rigging Operations

This review area focuses on the procedures and controls applicable to ensure that rigging operations are performed consistent with DOE requirements and can be performed safely by the construction forces.

Quality Assurance

This review area verifies that an approved Quality Assurance Plan is in place and is up to date to address quality assurance requirements pertinent to construction activities. This area also addresses QA during construction to ensure the final product meets the design and safety basis criteria.

Labor Management

This review area focuses on aspects of labor management necessary to ensure that the project can be successfully executed. The overall objective is to ensure the adequacy of the local craft labor force to support the project.

Construction Tools & Equipment

This area focuses on the availability and operability of the tools and equipment necessary to support the construction activities.

V. PREREQUISITES

Prior to initiating the review, the sponsor of the review should assure that the following activities and tasks have been completed and the results of such are documented and available to the review team;

- All designs completed and evidence of multi-discipline design reviews (with comments resolved).
- Constructability reviews completed (by construction STR equivalents) at 30% and 60% design completion with demonstrated comments incorporated.
- Construction Risks - properly recognized and addressed and mitigation strategies in place.
- Configuration Management processes in place and implemented.
- Change Control/Management processes and procedures in place and implemented.
- Construction and support staffing identified, qualified and in place or available.
- A Construction Execution Plan (CEP) or equivalent (satisfying the requirements of DOE) 413.3A “Construction Planning Documents” authored by the project construction manager and signed by the project manager, operations representative and all other members of the core and integrated contractor and federal project teams.

Core Documents Required

The project team should assemble necessary documents for review prior to the review team's arrival. These documents will include:

- Final Design Drawings and Specifications
- Results of and Responses to Site Final Design Review
- Project Execution Plan
- Construction Execution Plan
- Detailed Resource Loaded Schedule
- Detailed Cost Estimate
- System Functions and Requirements Document
- Risk Management Assessment
- Safety Documentation
- Acquisition Strategy

VI. REVIEW PLANS AND DOCUMENTATION

The Results of the Construction Readiness Review will be used by the DOE Federal Project Director and by the Acquisition Executive to determine whether the project can proceed to construction, implementation, procurement, or fabrication. As noted by DOE O 413.3A,

> *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 resources necessary, within the funds provided, to execute the project.*

It is important to clearly document the methods, assumptions and results of the CRR.
The following activities should be conducted as part of the review plan development and documentation/closure of the review:

- Subsequent to the selection, formation and chartering of the review team and receipt and review of the prerequisite documents listed in section 5 above, assignment of responsibilities for the development of specific performance objectives and criteria should be made.
- The review team members should develop specific performance objectives and criteria utilizing the topics and areas listed in the respective appendices of this module.

- The individual performance objectives and criteria should be compiled and submitted to the sponsor of the review for concurrence prior to starting the review.
- The project-specific review plan should be compiled with a consistent and uniform numbering scheme that provides for a unique identifier for each objective, arranged by subject area (e.g. Management-Personnel and Qualifications, Management-Processes and Systems, Technical-Civil, etc.) such that the results of each line of inquiry can be documented and tracked to closure.
- The performance objective and criteria evaluation can be accomplished via, document review, personnel interviews, or direct observation of an operation or any combination of these methods. The method used, the basis for closure/comment/finding, and the result of the inquiry should all be documented and tracked.

The overall Standard Review Plan provides guidelines for preparing a Review Plan and a final report.

VII. REFERENCES

- 29 CFR 1926, Safety and Health Regulations for Construction
- 10 CFR 851, Worker Safety and Health Program
- DOE Order DOE O 413.3A, Program and Project Management for the Acquisition of Capital Assets
- DOE Manual DOE M 413.3-1, Project Management for the Acquisition of Capital Assets
- DOE Standard DOE-STD-1189-YR Draft, Integration of Safety into the Design Process.
- DOE Order DOE O 420.1B, Facility Safety
- DOE Guide DOE G 420.1-1, Nonreactor Nuclear Safety Design Criteria and Explosives Safety Criteria Guide for use with DOE O 420.1(B) Facility Safety
- DOE Order DOE O 425.1, Startup and Restart of Nuclear Facilities
- DOE Order DOE O 430.1B, Real Property Asset Management
- DOE Guide DOE G 430.1-1, Chapter 3, Stages of Project Development
- DOE Standard DOE STD -3024-98, Content of System Design Descriptions
- DOE Standard DOE-STD-3006-2003, Handbook for the Conduct of Operational Readiness Reviews
- DOE Handbook DOE-HDBK-1132-99, Design Considerations
- DOE Order O 6430.1A, General Design Criteria
- NUREG-1718, Standard Review Plan for the Review of a Mixed Oxide (MOX) Fuel Fabrication Facility

APPENDIX A- PERFORMANCE AND CRITERIA

Legend of Construction Readiness Review Topics

Review Topical Area	Identifier
Management Systems	MGT
Construction Procedures	CP
Materials Management	MMGT
Safety Assurance	SA
Project Controls	PC
Construction Execution Plan	CEP
Training and Qualifications	T&Q
Work Planning	WP
Constructability	CON
Welding	WEL
Rigging Operations	RIG
Field Engineering	FE
Quality Assurance	QA
Labor Management	LM
Construction Tools and Equipment	CTE

ID #	Performance Objectives and Criteria[2]	Met?
Management Systems		
MGT-1	The Contractor Project organization is properly organized and staffed to carry out the construction efforts?	
	The Contractor has appointed a Project Manager responsible for the day to day management of the project and delivering the means, methods and resources to meet the contract end point requirements? **(MGT-1.1)**	
	Contractor personnel have been appointed to appropriate positions; e.g. Construction Management, Discipline Superintendents, Materials Managers, Subcontract Technical Representatives, and Field Representatives to properly supervise the fabrication and on-site construction efforts? **(MGT-1.2)**	
	Construction Oversight personnel have appropriate qualifications and have been trained to adequately oversee the construction activities? **(MGT-1.3)**	
	Roles and responsibilities of construction management and oversight personnel are properly established and understood by those involved in the project? **(MGT-1.4)**	

[2] *The site should provide the technical bases and assumptions that support the answers provided to each Line of Inquiry. If possible, the review teams should independently verify the technical bases and assumptions.*

ID #	Performance Objectives and Criteria[2]	Met?
	The project oversight team contains adequate numbers of personnel and they have not been assigned conflicting responsibilities? **(MGT-1.5)**	
MGT-2	A Performance Management System is in place, approved, and operating?	
	The Contractor Performance Management System is **compliant with ANSI/EIA-748-A-1998 and** has been reviewed and validated by the Office of Engineering and Construction Management (OECM)? **(MGT-2.1)**	
	The critical parameters of the project are being tracked in the DOE Project Assessment and Reporting System? **(MGT2.2)**	
	Cost and Schedule performance, milestone status, and financial status are being reported to DOE on a monthly basis? **(MGT-2.3)**	
	Quarterly Performance Reviews are being conducted and documented and results followed up? **(MGT-2.4)**	
	The Contractor has a system in place that tracks construction progress and status on a daily basis? **(MGT-2.5)**	
Construction Procedures		
CP-1	Construction procedures are in place to govern the execution of construction activities?	
	The construction organization has procedures to address the key elements of construction for the project? **(CP-1.1)**	
CP-2	Construction procedures are controlled and implement the project baseline?	
	Construction procedures are controlled by a procedure that addresses development, modification and approval of the procedures? **(CP-2.1)**	
	Construction procedures are based on and implement the current approved design documents? **(CP-2.2)**	
	Construction procedures are being maintained controlled in accordance with the governing procedure? **(CP-2.3)**	
CP-3	Construction procedures address the associated hazards and identify controls to prevent or mitigate the identified hazards?	
	Construction procedures are evaluated for hazards to the workers and controls are developed in accordance with the principles and requirements of the contractor document management system? **(CP-3.1)**	
	Construction procedures are periodically reviewed for accuracy and applicability? **(CP-3.2)**	
Materials Management		
MMGT-1	The Project Acquisition Strategy is complete for all phases of the project and has been updated based on Quarterly Performance Reviews?	
	An Acquisition Plan is in place for all subcontracts and has been reviewed by the Integrated Project Team and concurred in by both the Federal Project Director and the DOE Contracting Officer? **(MMGT-1.1)**	

ID #	Performance Objectives and Criteria[2]	Met?
	The master acquisition schedule supports the project overall deadlines and is consistent with the Project Execution Plan and The Construction Execution Plan, if not integral to the PEP? **(MMGT-1.2)**	
	Acquisition of long lead time items is properly included in the project planning and is consistent with the CEP? **(MMGT-1.3)**	
MMGT-2	Adequate space has been included in the site layout to accommodate additional equipment, materials, and any associated activities?	
	Material laydown areas do not interfere with emergency response and access. **(MMGT-2.1)**	
	Equipment and materials do not negatively impact traffic safety. **(MMGT-2.2)**	
	Material and Equipment assembly activities do not interfere with emergency response, access, and/or traffic safety. **(MMGT-2.3)**	
Safety Assurance		
SA-1	The Integrated Safety Management Description has been updated to address construction activities?	
	Safety plans for integrating safety management (including fire, occupational, radiological, IH, etc.) are completed and an integral part of the construction effort? **(SA-1.1)**	
	The requirements, methodology, and responsibility for ES&H activities are clearly identified and communicated? **(SA-1.2)**	
SA-2	A project safety and health plan is prepared as required by DOE O 413.3A and 10 CFR 851 Appendix A?	
	Safety programs, documentation and controls are in place and adequate to ensure the safety of personnel during the execution of construction activities? **(SA-2.1)**	
	Programs and processes are adequate to address changes in the site and activity hazards during the construction process? **(SA-2.2)**	
	Worker construction hazards are evaluated and controls adequately established. Addresses (as applicable): construction activities such as excavation work, concrete work, steel erection; and addresses construction related hazards such as vehicle usage, heavy equipment, and fall hazards? **(SA-2.3)**	
	Job Hazards Analyses reviewed, updated by appropriate discipline superintendents and/or other qualified personnel? **(SA-2.4)**	
SA-3	Safety programs/procedures adequately address applicable industrial hygiene and industrial safety elements?	
	Hazcom: Emergency plans with contacts and numbers have been distributed and personnel trained in the proper use of these plans? **(SA-3.1)**	
	Industrial Hygiene: Sampling programs developed to ensure respiratory protection, etc are identified, defined and ready to implement Exposure assessment strategy and surveillance monitoring requirements implemented? **(SA-3.2)**	

ID #	Performance Objectives and Criteria[2]	Met?
	Industrial safety program addresses applicable hazards such fall protection, eye and hearing protection, flammable material storage, fire extinguishers, scaffolding, ladder safety, electrical safety, rigging and material movement? **(SA-3.3)**	
	Lock-out/Tag-out: The contractor LOTO program meets the requirements of the applicable CFRs and DOE? **(SA-3.4)**	
	A job hazards analysis process is implemented to evaluate the hazards associated with planned activities and to identify the appropriate controls? **(SA-3.5)**	
	The contractor has implemented a confined space program? **(SA-3.6)**	
	A fall protection plan has been developed for the project with input from Civil Engineering and Safety Assurance personnel as appropriate? **(SA-3.7)**	
SA-4	A contractor self-assessment process is in place and adequate for the construction project?	
	A schedule is developed showing the self-assessments planned for the first 10 months of the construction project? **(SA-4.1)**	
SA-5	Contractor medical facilities and staff are sufficient to support the project?	
	Medical facilities and staff are sufficient for the daily needs of the project? **(SA-5.1)**	
	Medical facilities and staff are sufficient for medical placement exams, surveillance exams, and periodic exams as required by project personnel 10 CFR 851? **(SA-5.2)**	
SA-6	The contractor has an adequate inventory and supply of safety related equipment the project?	
	The contractor construction/baseline cost estimate considers the PEP needs such as fall arrest harnesses, lanyards, respirators, hard hats, etc.? **(SA-6.1)**	
	Adequate supplies of IH monitoring equipment and related supplies are available to support the project? **(SA-6.2)**	
SA-7	Emergency response procedures list requirements for personal protective equipment, first aid, medical care, or emergency egress and are written and communicated to all employees?	
	Procedures include provisions for emergency telephone numbers, exit routes, and training drills? **(SA-7.1)**	
	Contractor and sub-contractor personnel, consultants, and any visitors in contractor controlled spaces know precisely what to do, and where to go in various cases of emergency? **(SA-7.2)**	
	Evacuation routes are known and clearly marked? **(SA-7.3)**	
SA-8	Safety basis documents are complete and approved to support construction activities?	
	A Preliminary Documented Safety Analysis is complete and approved by a DOE Safety Evaluation Report? **(SA-8.1)**	
	No SER conditions of approval are affected by planned construction activities (SA-8.2)?	

ID #	Performance Objectives and Criteria[2]	Met?
Project Controls		
PC-1	The PEP and CEP are controlled documents and changes to the project which may impact the Performance Baseline are controlled through a formal process of evaluation and documentation?	
	The project is subject to a formal change control system which ensures that change requests to the project are documented, evaluated, and formally resolved. **(PC-1.1)**	
	The project change control system is documented in the PEP which also identifies the overall Performance Baseline, and the individual technical, schedule and cost baselines, against which changes are monitored and controlled? **(PC-1.2)**	
	Each organizational level (as appropriate and documented in the Project Execution Plan) manages a Change Control Board meeting the requirements of DOE M 413-1 for disposition of baseline change proposals within their level of authority/control. Board meetings and decisions are documented through meeting minutes and letters-of-decision? **(PC-1.3)**	
PC-2	A functioning project control system is in place for managing project baselines using earned value techniques, variance analysis, contingency/reserve management and effective reporting in accordance with DOE orders and guidelines?	
	If the project has a total cost of ≥ $20M the Earned Value Management System has been certified as compliant with ANSI/EIA-748? **(PC-2.1)**	
	Work tasks are defined and the tasks assigned to organizations responsible for performing the work? **(PC-2.2)**	
	Work packages are organized based on dependencies, interdependencies, constraints and other factors into a time-phased sequence that will fit within the boundaries established by mission dates and available budget? **(PC-2.3)**	
	Is there adequate capability to provide for timely and accurate transfer of actual cost information from the accounting system into the earned value management system? **(PC-2.4)**	
	Is the project reporting and analyzing EVM information and is management acting on these analyses? **(PC-2.5)**	
	Is the control process for incorporation of formal changes adequate? **(PC-2.6)**	
	The contractor has established a Performance Measurement Baseline which is up to date and includes all elements of the project Work Breakdown Structure? **(PC-2.7)**	
PC-3	The contractor has a functioning program for field project control – the program is focused on the successful management and execution of working level schedules that support the project baseline schedule?	
	The contractor has work level schedules for the construction project and the first three months are in appropriate detail to support all necessary field activities? **(PC-3.1)**	

ID #	Performance Objectives and Criteria[2]	Met?
	The contractor program includes regularly scheduled meetings and progress reports to revise and update the working level schedule as the project is executed? **(PC-3.2)**	
	The contractor field project control program includes provisions to address schedule variances and recover schedule if and when execution delays occur? **(PC-3.3)**	
Construction Execution Plan		
CEP-1	A Construction execution plan has been developed for the project?	
	The CEP has been developed and approved by the appropriate personnel? **(CEP-1.1)**	
	The CEP is based on and supports the DOE approved project baseline schedule? **(CEP-1.2)**	
CEP-2	The construction execution plan addresses the necessary key elements?	
	The CEP addresses and includes the following elements as appropriate for the project: • Work Breakdown structure • Principal work sequences and key logic links • Logistical issues affecting work efficiency such as access/egress, materials receipt and handing, waste management • Crane use strategy • Off site production and lead in • Detailed methodologies and sequences to address any non-routine construction activities? **(CEP-2.1)**	
	The Construction Execution Plan (CEP) contains comprehensive project-specific descriptions of the project, site plans, and schedules sufficient to facilitate understanding of the work required. **(CEP-2.1)**	
Training and Qualification		
T&Q-1	The contractor training program ensures the work force is trained and qualified with the knowledge, skills, and abilities to effectively perform their work while protecting themselves, coworkers, the public and the environment?	
	Has appropriate training and qualification been specified for personnel based on their assigned tasks and responsibilities? **(T&Q-1.1)**	
	Personnel assigned tasks are trained and qualified in accordance with federal or state laws, DOE directives and other applicable requirements? **(T&Q-1.2)**	
	Are equipment operators certified and/or qualified to operate assigned equipment? **(T&Q-1.3)**	
T&Q-2	Personnel are trained and qualified to handle hazardous materials and waste as required by federal or state laws, DOE directives and other applicable requirements?	
	Employees receive introduction training with respect to hazardous materials in the general employee training? **(T&Q-2.1)**	
	Project specific training is provided as required to meet the requirements of 29 CFR 1910.120 or 29 CFR 1926? **(T&Q-2.2)**	

ID #	Performance Objectives and Criteria[2]	Met?
T&Q-3	Adequate training staff and resources are available for the required ES&H training related to construction?	
	Required ES&H training is identified and tracked for newly hired workers (manual and non-manual)? **(T&Q-3.1)**	
	ES&H training resources account for all types of required training. Examples: Site Orientation, Fall Protection, Powered Industrial Truck? **(T&Q-3.2)**	
Work Planning		
WP-1	Work processes are controlled by documents that are developed and approved in accordance with the applicable requirements?	
	Work processes are controlled by approved instructions, procedures, design documents, technical standards, or other hazard controls appropriate to the specific tasks to be performed? **(WP-1.1)**	
	Work documents are maintained under a change control process? **(WP-1.2)**	
WP-2	Work documents consider the hazards associated with the work (both from the task and the environment) and include the appropriate controls?	
	Work documents identify hazards and controls in a clear manner that ensures that workers understand? **(WP-2.1)**	
	The work document process requires that hazards analyses and controls be updated when conditions or tasks have changed? **(WP-2.2)**	
	The work planning and management process includes a defined and implemented process for the control and incorporation of field changes both to drawings and work documents? **(WP-2.3)**	
WP-3	The contract preventative maintenance program is adequate for the permanent and temporary equipment to be used during construction?	
	The PM frequencies for equipment are within the ranges specified by the equipment specifications? **(WP-3.1)**	
Constructability		
CON-1	The Contractor has performed a thorough and comprehensive assessment of the project's readiness for construction?	
	The Contractor has performed an adequate Design Authority review of the final project design and has resolved all significant findings? **(CON-1.1)**	
	The Contractor has reviewed all subcontractor submittals for completeness and for the flow down of design details to construction drawings? **(CON-1.2)**	
	There is evidence that the Contractor has evaluated DOE/industry applicable lessons learned that are commensurate with the type of construction being planned? **(CON-1.3)**	
CON-2	Site Preparation Activities have are adequately planned to ensure that construction can proceed safely.	

ID #	Performance Objectives and Criteria[2]	Met?
	Site Grading has been accomplished so as to provide for adequate surface drainage, preservation of the natural character of the terrain by minimum disturbance of existing ground forms. Site grading design has also ensured the safety and ease of personnel and vehicular access to the facility? **(CON-2.1)**	
	Onsite roadways and corridors are planned and laid out to minimize worker hazards? **(CON 2.2)**	
	Sidewalks and walk gradients provide for safe and convenient facility access and egress and inter-facility circulation. Widths of walks are based on anticipated traffic. Steps in walks and entrances are minimized to the extent possible? **(CON-2.3)**	
	To the extent possible construction roads shall be established in locations and with profiles proposed for the final road system, and with shoulders and bases that can be surfaced after the construction period for use as the permanent roads. **(CON-2.4)**	
	Construction of road ditches and other work necessary to obtain adequate drainage and stabilization of soil for roads and construction areas has been completed as early as possible in the project construction phase? **(CON-2.5)**	
	Corps of Engineers or other appropriate design manuals have been utilized for technical guidance in the areas of hydrology and open-channel design for storm drainage. Open drainage ditches protected against erosion are used to the maximum extent practicable and are designed for not less than a 25-year frequency storm. Locally available materials are utilized for culverts and pipe systems, where economical? **(CON-2.6)**	
	Site support equipment and facilities such as personnel trailers, restrooms, telecommunications, and document processing equipment are in place, operational and adequate for the construction project? **(CON-2.7)**	
CON-3	Construction plans give appropriate sequencing to work and installation of equipment?	
	Installation of large or bulky equipment will not be impeded by obstructions or ongoing work? **(CON-3.1)**	
	Areas where electrical conduit and process piping will be installed are accessible? **(CON-3.2)**	
	Installation of piping or other systems is sequenced such that it doesn't impede performance of important safety systems (e.g., sprinkler heads not covered up)? **(CON-3.3)**	
Field Engineering		
FE-1	Engineering design personnel are available to support construction activities	
	Design authorities are planned to be onsite and/or readily available to address technical issues that arise during construction (e.g., changing field conditions that affect designed components, modifications to design, etc)? **(FE-1.1)**	

ID #	Performance Objectives and Criteria[2]	Met?
FE-2	The contractor has established adequate procedures, trained and qualified personnel, and equipment and materials related to civil/structural areas of concern	
	Concrete plant equipment including trucks is adequate, properly maintained and at a level of cleanliness to support the concrete batch quality requirements. **(FE-2.1)**	
	Concrete plant procedures and records are adequate to maintain control of concrete batches and to document the quality of the mix. **(FE-2.2)**	
	Concrete Reinforcement plans include provisions for installation, preparation, preservation and support of reinforcing members in accordance with the design documentation? **(FE-2.3)**	
	Equipment inspection procedures, i.e. crane, lifts, government owned equipment etc. are defined, and documents are in place? **(FE-2.4)**	
	Concrete conveying equipment is available and ready to use. Tools supporting concrete placements (vibrators (appropriate diameters, large and small), surfacing equipment and cold weather protection as applicable) are in place. **(FE-2.5)**	
	Arrangements are in place for scheduling of concrete mixing, delivery, and placement to meet specified time requirements. **(FE-2.6)**	
	Plans for in situ testing, sampling, and laboratory analysis of concrete placement are in place and adequately documented to meet quality assurance requirements. **(FE-2.7)**	
	Has a project specific structural steel erection plan and schedule been developed? **(FE-2.8)**	
FE-3	The contractor has established adequate procedures, trained and qualified personnel, and equipment and materials related to mechanical systems	
	A detailed installation and execution plan has been developed that addresses manpower and material delivery dates? **(FE-3.1)**	
	The construction team has determined the installation milestones to be used for monitoring and reporting the equipment installation progress? **(FE-3.2)**	
FE-4	The contractor has established adequate procedures, trained and qualified personnel, and equipment and materials related to plant instrumentation	
	A detailed instrumentation installation and execution plan has been developed that addresses manpower and material delivery dates? **(FE-4.1)**	
	The construction team has determined the instrumentation installation milestones to be used for monitoring and reporting the equipment installation progress? **(FE-4.2)**	
FE-5	The contractor has established adequate procedures, trained and qualified personnel, and equipment and materials related to piping	

ID #	Performance Objectives and Criteria[2]	Met?
	A detailed piping installation and execution plan has been developed that addresses manpower and material delivery dates? **(FE-5.1)**	
	The construction team has determined the piping installation milestones to be used for monitoring and reporting the equipment installation progress? **(FE-5.2)**	
FE-6	The contractor has established adequate procedures, trained and qualified personnel, and equipment and materials related to electrical systems	
	A detailed electrical systems installation and execution plan has been developed that addresses manpower and material delivery dates? **(FE-6.1)**	
	The construction team has determined the electrical systems installation milestones to be used for monitoring and reporting the equipment installation progress? **(FE-6.2)**	
Welding		
WEL-1	Welding activities are performed in accordance with the applicable standards and site procedures to ensure that the welds meet the criteria specified in the design and are performed safely?	
	Welding is performed and inspected in accordance with the applicable standards and site procedures to ensure the welds meet the design specifications? **(WEL-1.1)**	
Rigging Operations		
RIG-1	Hoisting and rigging operations for the construction activities are performed in accordance with chapter 15 of DOE-STD-1090-2007 and site procedures?	
	Personnel operating mobile cranes are qualified in accordance with section 15.2.1 of the standard and applicable site procedures? **(RIG-1.1)**	
	Personnel operating forklift trucks are qualified in accordance with section 15.2.2 of the standard and applicable site procedures? **(RIG-1.2)**	
	Personnel performing rigging operations are qualified in accordance with section 15.2.3 of the standard and applicable site procedures? **(RIG-1.3)**	
	Persons-in-charge are qualified in accordance with section 15.2.4 of the standard and applicable site procedures? **(RIG-1.4)**	
	Designated leaders are qualified in accordance with section 15.2.5 of the standard and applicable site procedures? **(RIG-1.5)**	
	Inspectors are qualified in accordance with section 15.2.6 of the standard and applicable site procedures? **(RIG-1.6)**	
	Maintenance personnel are qualified in accordance with section 15.2.7 of the standard and applicable site procedures? **(RIG-1.7)**	
Quality Assurance		
QA-1	The quality assurance plan is up to date and addresses construction activities and associated procurements?	
	A quality assurance program is established, documented and updated to address construction related activities? **(QAP-1.1)**	

ID #	Performance Objectives and Criteria[2]	Met?
	Quality assurance factors, including standards, specifications and limitations have been identified? **(QAP-1.2)**	
	A quality control and quality assurance oversight organization is in place and functional? **(QAP-1.3)**	
QA-2	Organization and construction related interfaces are identified and controlled?	
	Organizational responsibilities are described for preparing, reviewing, approving, and verifying construction and procurement documents? **(QA-2.1)**	
	Internal and external construction interface controls, procedures, and lines of communication among participating organizations and across technical disciplines are established and described for the review, approval, release, distribution, and revision of documents involving construction interfaces? **(QA-2.2)**	
QA-3	Procurement Documents are prepared with appropriate content and specificity?	
	Technical requirements specifically reference drawings, specification, codes, etc., that describe the items or services being furnished? **(QA-3.1)**	
	Test, inspection, and acceptance criteria are identified? **(QA-3.2)**	
	QA program requirements are specified and commensurate with the importance and/or complexity of the item or service being provided? **(QA-3.3)**	
	Right of access to suppliers and sub-tier suppliers facilities and records is provided? **(QA-3.4)**	
	Requirements for the supplier's reporting of non-conformances are specified? **(QA-3.5)**	
	Contractor procedures require a documented review of the accuracy of procurement documents prior to award? **(QA-3.6)**	
QA-4	Procurement of purchased items is controlled to ensure conformance with specified requirements?	
	Supplier's capabilities are evaluated (i.e., history, records, facilities) and documented? **(QA-4.1)**	
	Controls are in place to ensure submittal and evaluations of supplier-generated documents are accomplished in accordance with QA program requirements? **(QA-4.2)**	
	Acceptance methods and associated criteria such as certificates of conformance are established and documented? **(QA-4.3)**	
	Methods for control and disposition of supplier non-conformances that don't meet procurement QA requirements is specified? **(QA-4.4)**	
QA-5	Controls are established that ensure that correct and accepted items are installed in the facility?	
	Production related information is identified and evident on items to be installed? **(QA-5.1)**	
	Where physical identification is impractical, other identification methods are required such as physical separation or procedural control? **(QA-5.2)**	

ID #	Performance Objectives and Criteria[2]	Met?
	Any pertinent special requirements necessary for item identification are specified (e.g., items with limited life, specific identification or traceability to code requirements)? **(QA-5.3)**	
QA-6	Special processes that are necessary to ensure quality of construction (such as those supporting welding, heat treating, and NDA) are required to be performed by qualified individuals in accordance with established procedures?	
	Activities and qualifications (personnel, equipment) are appropriately addressed in Instructions and procedures? **(QA-6.1)**	
	Acceptance criteria and requirements of applicable codes and standards are specified in procedures? **(QA-6.2)**	
	Records are maintained for qualification of personnel, processes and equipment? **(QA-6.3)**	
QA-7	Inspections and tests required to verify conformance of items to QA requirements are planned and specified?	
	Inspection requirements and acceptance criteria are consistent with the design requirements or other technical documents? **(QA-7.1)**	
	Inspection hold points are identified where necessary? **(QA-7.2)**	
	A planned inspection of items under construction is specified? **(QA-7.3)**	
	Any required testing that is necessary to verify conformance of items is specified, as well as the requirement to document the results of any tests? **(QA-7.4)**	
Labor Management		
LM-1	Labor management is adequately addressed in the construction execution plan and the other appropriate project control and baseline documents?	
	There is a labor plan included as part of the construction execution plan and includes a craft manpower curve presented by trade? **(LM-1.1)**	
	A local labor survey has been conducted to determine the craft/labor availability? **(LM-1.2)**	
	Local labor craft skills and productivity have been assessed and are adequate to support the project? **(LM-1.3)**	
	The current and local employment has been evaluated? **(LM-1.4)**	
	Local critical craft shortages have been evaluated? **(LM-1.5)**	
	The contractor has a process in place for craft recruiting and requisitioning? **(LM-1.6)**	
LM-2	Craft resources required and the necessary training are identified and managed by the contractor during the construction project?	
	Craft training programs are in place and adequate? **(LM-2.1)**	
	Craft manpower requirements are preplanned and properly requisitioned using the contract program? **(LM-2.2)**	
	Craft manpower curves are being maintained and used to manage the project? **(LM-2.3)**	

ID #	Performance Objectives and Criteria[2]	Met?
Construction Tools and Equipment		
CTE-1	Construction tools and equipment needs are evaluated and identified in the construction execution plan or other project baseline documents.	
	The equipment schedule matches the manpower staffing and equipment forecasts, (e.g. welders to welding machines)? **(CTE-1.1)**	
	Are maintenance requirements including spare parts requirements and equipment standardization considered during the equipment selection process? **(CTE-1.2)**	
	Does a contractor process exist to evaluate equipment utilization? **(CTE-1.3)**	
CTE-2	Construction tools and equipment are maintained as required to ensure their safe operation during for the project.	
	Lube and oil change requirements are established for each piece of equipment? **(CTE-2.1)**	
	Required preventive maintenance is performed? **(CTE-2.2)**	
	The contractor has established an equipment maintenance program as appropriate for the project. **(CTE-2.3)**	
	Equipment repair records are maintained? **(CTE-2.4)**	
	Do equipment maintenance schedules show scheduled routine, periodic and preventative maintenance and inspections? **(CTE-2.5)**	