

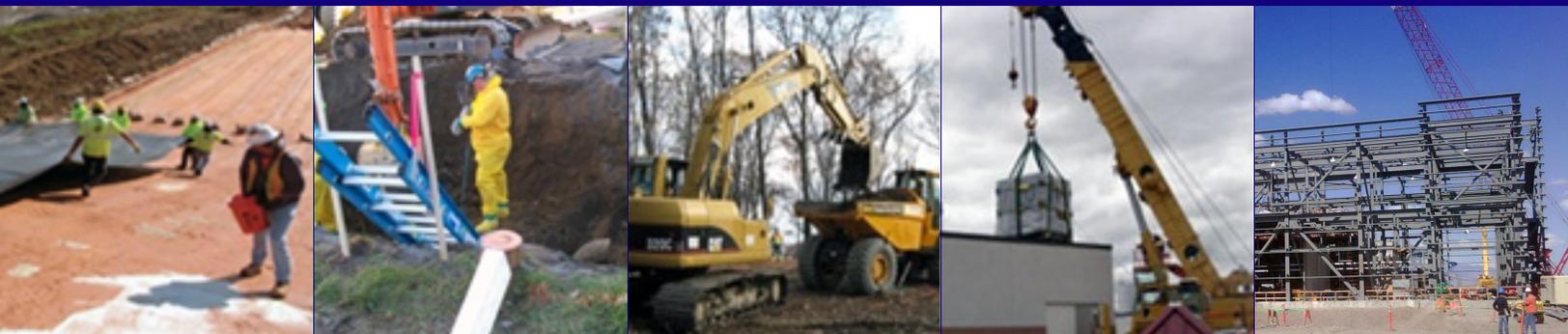


DOE - EM - SRP - 2010
2nd Edition

Environmental Management
Safety ▪ Performance ▪ Cleanup ▪ Closure

STANDARD REVIEW PLAN (SRP)

SAFETY DESIGN STRATEGY 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)

Safety Design Strategy (SDS)

Review Module

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



March 2010

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

CD	Critical Decision
COR	Code of Record
CSDR	Conceptual Safety Design Report
DOE	Department of Energy
EM	Environmental Management
FPD	Federal Project Director
FRAM	Functions, Responsibilities, and Authorities Manual
IPT	Integrated Project Team
LOIs	Lines of Inquiry
RM	Review Module
SBAA	Safety Basis Approval Authority
SDIT	Safety Design Integration Team
SDS	Safety Design Strategy
SER	Safety Evaluation Report
SS	Safety Structure
SC	Safety Class

I. INTRODUCTION

Integration of safety into the design development is a key element of the Department of Energy (DOE) design project design process and programs. In a memorandum to DOE elements, dated December 5, 2005, on integration of Safety-in-Design, the Deputy Secretary of Energy stated:

I expect safety to be fully integrated into design early in the project. Specifically, by the start of the preliminary design, I expect a hazard analysis of alternatives to be complete and the safety requirements for the design to be established. I expect both the project management and safety directives to lead projects on the right path so that safety issues are identified and addressed adequately early in the project design.

The need to integrate safety into the design from the earliest stages is identified in DOE O 413.3A, Change 1, and *Program and Project Management for the Acquisition of Capital Assets*. The order requires the development of a Conceptual Safety Design Report for CD-1, a Preliminary Safety Design Report at CD-2, a Preliminary Documented Safety Analysis Report for CD-3, and a Documented Safety Analysis Report for CD-4.

DOE-STD-1189-2008, *Integration of Safety into the Design Process*, provides the Department's expectations for incorporating safety into the design process for new or major modifications to DOE Hazard Category 1, 2, and 3 nuclear facilities. The Standard describes the safety-in-design philosophies to be used with the project management requirements of DOE O 413.3A. The Standard addresses the development of a Safety Design Strategy (SDS). Review of the SDS is an essential element to the assurance that the project will meet the requirements and expectations of DOE Orders and guidance and should be completed prior to authorization to proceed to CD-1 and CD-2.

II. PURPOSE

The SDS Review Module (RM) is a tool that assists DOE federal project review teams in evaluating the adequacy of the conceptual safety design strategy documentation package (Conceptual Safety Design Report) prior to CD-1 approval and the adequacy of the preliminary safety design strategy documentation packaged (Preliminary Safety Design Report) prior to CD-2 approval. The SDS RM focuses on the safety design package key elements including safety guidance and requirements, hazards identification, key safety decisions, risks to project safety decisions, safety analysis approach and plan, and safety design integration team interactions.

III. ROLES AND RESPONSIBILITIES

A successful SDS review depends on an experienced and qualified team. The team should be augmented with appropriate subject matter experts selected to complement the specific technical concerns of the project being reviewed. The specific types of expertise needed will be dependent on the type of facility being reviewed, as well as other factors such as complexity and hazards/risks.

It is strongly recommended that the team leader should either be a project or systems engineer experienced in the management of a multi-disciplined review team (e.g. fire protection, criticality, radiological protection, nuclear) that matches to the extent practicable the contractor's Safety Design Integration Team (SDIT).

Management support is another necessary component to a successful SDS review. Field element managers, as well as the Federal Project Director (FPD) and his/her Integrated Project Team (IPT), must recognize the importance of the SDS review and facilitate the resources necessary for its execution. This also requires appropriate interfaces with Environmental Management (EM) headquarters personnel who may direct or participate in the SDS review process.

The roles and responsibilities for all involved in the SDS review must be clear and consistent with various requirements of DOE O 413.3A and the DOE Functions, Responsibilities, and Authorities Manual (FRAM). The table below provides a compilation of SDS 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 review.
	Facilitates the conduct of the review. 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	Identifies the need for a SDS review and determines the scope of the review effort.
	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.
	Coordinates the Federal site staff factual accuracy review of the draft report.
	Leads the development of the corrective action plan if required. Tracks the completion of 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 areas selected for review, 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 SDS review pre-visit.
	Leads the review team in completing the Review Criteria for the various areas to be reviewed.
	Coordinates the development of the data call and forwards to the Federal Project Director, a list of documents, briefings, interviews, and presentations needed to support the review.

Position	Responsibility
	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 and characterizes the findings.
	Coordinates incorporation of factual accuracy comments by Federal and Contractor personnel on the draft report.
	Forwards the final review report to the Acquisition Executive for consideration in making the decision to authorize approval of the Critical Decision (CD).
	Participates, as necessary in the closure verification of the findings from the review report.
Review Team Member	Refines and finalizes the criteria for assigned 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 input to 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.

IV. REVIEW SCOPE AND CRITERIA

This SDS RM provides a set of performance expectations and criteria that are organized based on the key technical and safety areas and disciplines identified in the DOE Orders and guidance. If best practices are available, the performance expectations and criteria are included and shown in *italic*. These review areas are summarized below and include safety guidance and requirements, hazards identification, key safety decisions, risks to project safety decisions, safety analysis approach and plan, safety design integration team interactions, and Code of Record.

The SDS must be approved by the FPD and Safety Basis Approval Authority (SBAA), though DOE-STD-1189-2008 does not require a Safety Evaluation Report (SER) or equivalent to document the approval basis. For the purposes of meeting the standard the approval basis may be in the form of a letter that is formally transmitted to the design contractor. The DOE Lead Reviewer shall ensure that a formal correspondence package addresses whether the following elements are met:

- (1) The SDS is prepared by the design contractor’s SDIT (i.e., reflects input from appropriate project personnel);

- (2) SDS format and content are consistent with DOE-STD-1189-2008, Appendix E; and
- (3) The SDS is submitted to DOE prior to official contractor submission of a facility's conceptual design documents (an exception is when the implementation date of DOE-STD-1189 is subsequent to conceptual design).

As verification that the SDS is compliant with DOE-STD-1189-2008 (Item #2 above), Appendix A performance expectations and criteria are provided and must be completed by the DOE Lead Reviewer and attached to the official correspondence package approving the SDS.

If any of the above elements are not satisfactorily addressed, the DOE Lead Reviewer should prepare correspondence that either rejects the SDS or provides explicit actions expected on the part of the design contractor (i.e., actions, completion dates). The SDS should be rejected if it has major deficiencies with respect to DOE-STD-1189-2008 requirements. In cases where the SDS has incomplete information because of the lack of available design information, the Lead Reviewer may consider a condition of approval with expectations tied to future design phases.

For each review area, Appendix A of this review 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 SDS review teams to develop their project-specific Lines of Inquiry (LOIs).

Safety Guidance and Requirements

This area of the review is intended to ensure that the SDS presents the overarching philosophies and goals to be used by the project to address the identified hazards. This review area also addresses the adequacy of the criteria or approach to safety functional classification and the safety design criteria to be applied to the project.

Hazard Identification

This area is focused on ensuring that the documentation provides a logical discussion of the major hazards involved in the project and the possible consequences those hazards may pose. This review area will also ensure that the hazards identification is based on the initial or assumed inventories.

Key Safety Decisions

The purpose of this review area is to ensure that safety decisions that could potentially result in significant cost or have resulted in costly rework in past projects are explicitly addressed and the strategy is justified.

Risks to Project Safety Decisions

This review area is designed to ensure that the any key risks associated with the identified safety decisions are identified and addressed.

Safety Analysis Approach and Plan

This review area ensures that the SDS adequately describes the safety analysis process and deliverables planned for the project.

Safety Design Integration Team – Interfaces and Integration

This review area is focused on the evaluation of the strategy for establishing and employing an SDIT within the project. The review area will also address the primary interfaces not only for the design function but also for major project areas and disciplines.

Code of Record

The review area focuses on whether the contractor has a process to identify and document all the requirements for the project and place them in change control early in the design process.

V. REVIEW PLANS AND DOCUMENTATION

The execution of a review of the SDS as directed by the FPD is essentially an internal review. Documentation of this review should be consistent with management assessment, self assessment programs, and identified deficiencies or opportunities for improvement that must be clearly identified and tracked to closure to ensure the effectiveness of the IPT and federal project team and the ultimate success of the project.

VI. REFERENCE MATERIAL

- DOE Order 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.
- DOE Manual DOE M 413.3-1, Project Management for the Acquisition of Capital Assets
- DOE Order DOE O 420.1B, Facility Safety
- Interim EM Policy on Code of Record for Nuclear Facilities, September 2009

APPENDIX A - PERFORMANCE OBJECTIVES AND CRITERIA

Legend of Safety Design Strategy Review Topics

Review Topical Area	Identifier
Safety Guidance and Requirements	SG
Hazards Identification	HI
Key Safety Decisions	SD
Risks to Project Safety Decisions	PR
Safety Analysis Approach & Plan	SA
SDIT Interface and Integration	II
Code of Record	COR

ID #	Performance Objectives and Criteria ²	Met?
Safety Guidance and Requirements		
SG-1	Are safety guidance and requirements (overarching philosophies and goals) for the project presented in the SDS document?	
	Is the Safety-in-Design approach and philosophy discussed and presented (e.g., minimization of materials-at-risk, passive controls over active, etc) in sufficient detail in the SDS? (SG-1.1)	
	Is a description of criteria or approach for safety functional classification of radiological hazards to public and workers presented in the SDS and meets STD-1189, Appendix A? (SG-1.2)	
	Does the SDS identify safety design criteria to be applied to the project (overarching requirements are sufficient, e.g., commitment to DOE G 420.1-1, -2)? (SG-1.3)	
Hazards Identification		
HI-1	Is the SDS document hazard identification information complete?	
	Are major hazards and possible consequences adequately discussed in the SDS document? (HI-1.1)	
	Does the SDS hazard identification based on initial or assumed hazardous inventories? (HI-1.2)	
	Does the SDS assume hazardous inventories are consistent with that used in the initial hazard categorization in accordance with DOE-STD-1027-92? (HI-1.3)	
Key Safety Decisions		
SD-1	Are key safety decisions (those that potentially result in significant cost or have resulted in costly rework in past projects) explicitly addressed, assumptions and values used are consistent with hazard identification information and the strategy is justified?	
	Does Seismic and other natural phenomena design categorization meets DOE Interim Guidance on Safety Integration into Early Phases of Nuclear Facility Design and DOE-STD-1189, Appendix A? (SD-1.1)	

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?
	Does Confinement strategy discuss overall approach, including active systems and associated safety functional classification? Is Strategy consistent with DOE Interim Guidance on Safety Integration into Early Phases of Nuclear Facility Design and DNFSB Recommendation 2004-2 Implementation Plan Document "Ventilation System Evaluation Guidance for Safety-Related and Non-Safety- Related Systems"? (SD-1.2)	
	Does fire mitigation strategy include discussion of fire barriers, segregation, and safety functional classification of suppression systems? Is strategy consistent with DOE Interim Guidance on Safety Integration into Early Phases of Nuclear Facility Design? (SD-1.3)	
	Are major safety functions, their function classification (Safety Class (SC), Safety Structure (SS)) and major safety function (e.g. confinement) are adequately presented? (SD-1.4)	
Risks to Project Safety Decisions		
PR-1	Are the risks to project safety decisions are summarized in the SDS? Are risks associated with key safety decisions described (e.g., new technology, need for additional data to substantiate assumptions, hazardous material inventory assumptions) in the SDS and included in the Risk Management Plan? (PR-1.1)	
Safety Analysis Approach and Plan		
SA-1	Does the SDS adequately describe the safety analysis approach and plan for deliverables? Are deliverables expected to be completed, submitted, and approved described for all project phases? (SA-1.1) Is integration with other safety discipline efforts described (e.g., Fire Hazards Analysis)? (SA-1.2) Are any tailoring approaches affecting safety basis described? (SA-1.3) Is use of any safety analysis tools not included in the DOE Safety Software Central Registry described and justified? (SA-1.4)	
SDIT – Interfaces and Integration		
II-1	Does the SDS describe the strategy for employing an SDIT and the key SDIT interfaces? Is the role of the Safety Design Integration Team is described, along with any key interactions among Integrated Project Team? (II-1.1)	
Code of Record		
COR -1	Does the SDS describe a process for identifying and maintaining the set of requirements to facilitate accessibility, traceability and maintainability of the requirements throughout project lifecycle? Is initiation of COR development at conceptual design prior to CD-1 approval? (COR-1.1) Is there updates COR at preliminary design prior to CD-2 approval? (COR-1.2) Is the DOE review and approval of COR prior to CD-2 approval prior to final design? (COR-1.3) Is there COR under change control before initiation of the final design phase? (COR-1.4)	
	Is there back fit strategy during final design, construction, operation, and decommissioning? (COR-1.5)	