DOE STD-1189 IMPLEMENTATION

•Andrew Vincent

•SRNS

•Nuclear & Criticality Safety Engineering

•DOE ISM Champions Workshop, September 2010.

Speaker Biography

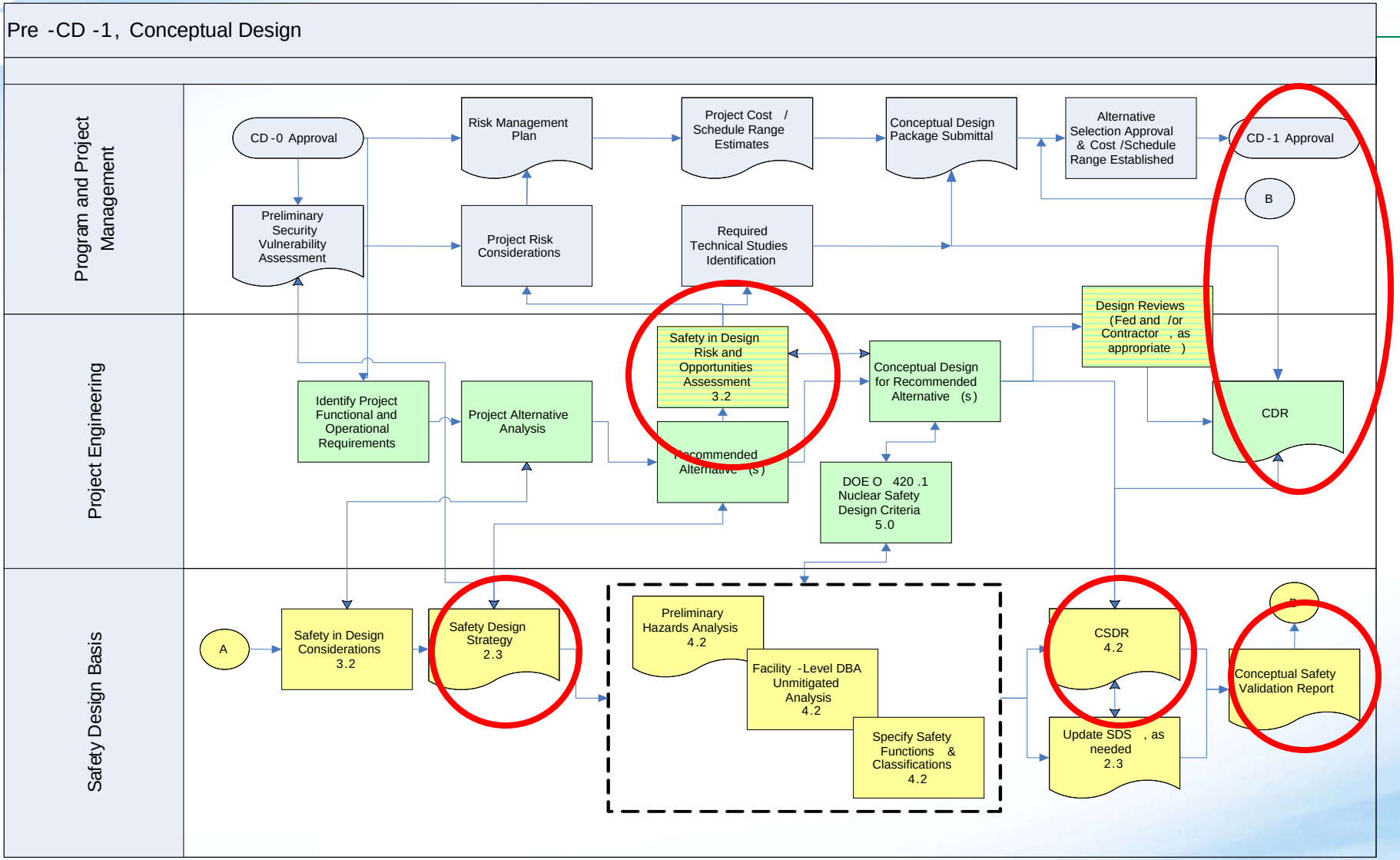
Andrew Vincent

Currently the Nuclear Safety Program Manager for SRNS within the Nuclear & Criticality Safety Engineering Organization. Over 28 years experience at the Savannah River Site, including Reactor thermal-hydraulics and physics design and technical management, Safety Basis document development and implementation, and nuclear safety program management. Served as the EFCOG Safety Analysis Working Group chair 2007 & 2008. BS & MS in Nuclear Engineering from Oregon State University.

STD-1189 OVERVIEW

- Mandatory Implementation
- Integrates Safety into the Design Process
- Applicable to the design and construction of:
  - New DOE hazard category (HC) 1, 2, and 3 nuclear facilities
  - Major modifications to DOE HC 1, 2, and 3 nuclear facilities (as defined by 10 CFR 830)
  - Other modifications to DOE HC 1, 2, and 3 nuclear facilities managed under the requirements of DOE O 413.3A
- In Summary – DOE-STD-1189 *"… objective is to reduce the likelihood of costly late reversals of design decisions involving safety."*

CONCEPTUAL DESIGN PHASE



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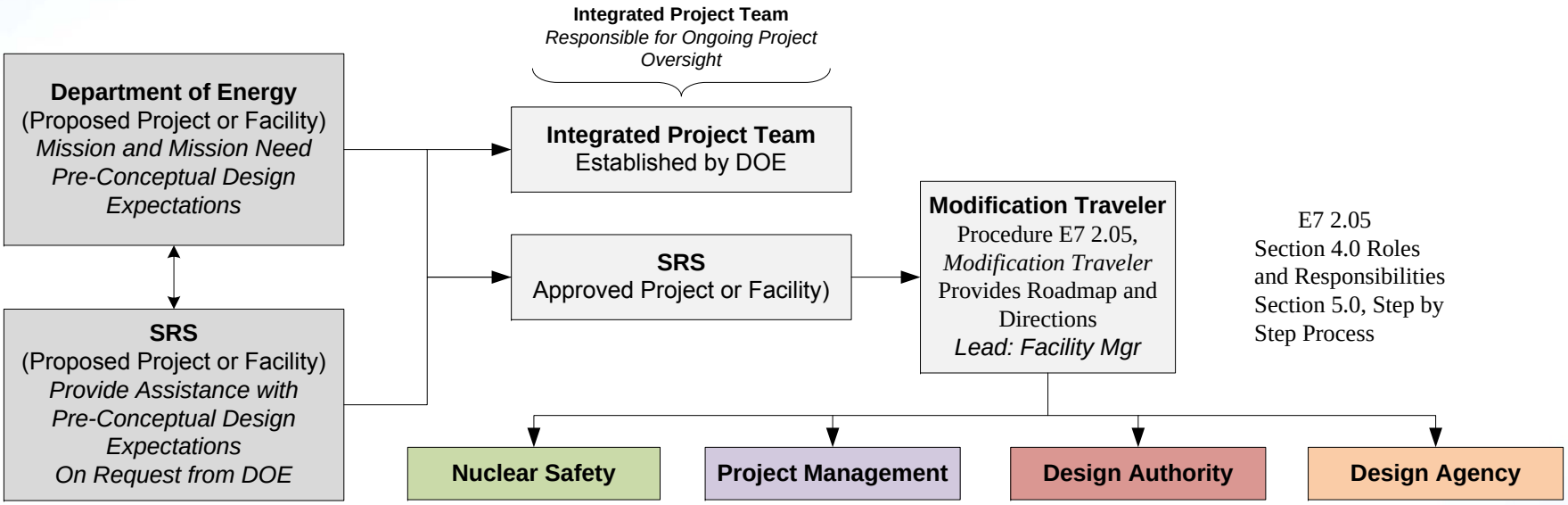
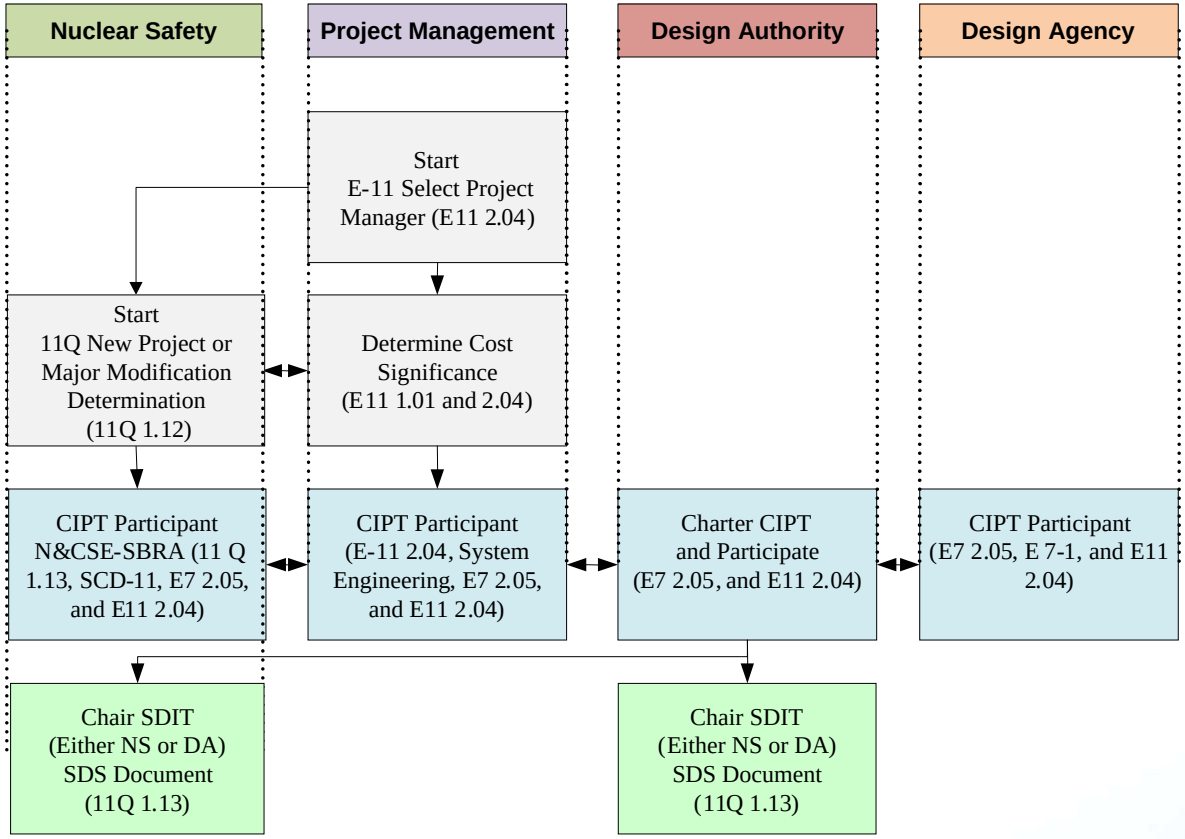
PROJECT INITIATION



SRS STARTUP

Procedure Manuals

- Project Management
  - ? Cost
  - ? Schedule
  - ? O413.3 Compliance
- Engineering Design
- Engineering Operations
- Nuclear & Criticality Safety
  - ? STD1189 Compliance
- Security
- Fire Safety
- Chemical Safety
- Industrial Safety



Contractor Integrated Project Team
Responsible for Ongoing Project Oversight

Safety Design Integration Team
Responsible for Ensuring Ongoing Safety in Design Requirements are met

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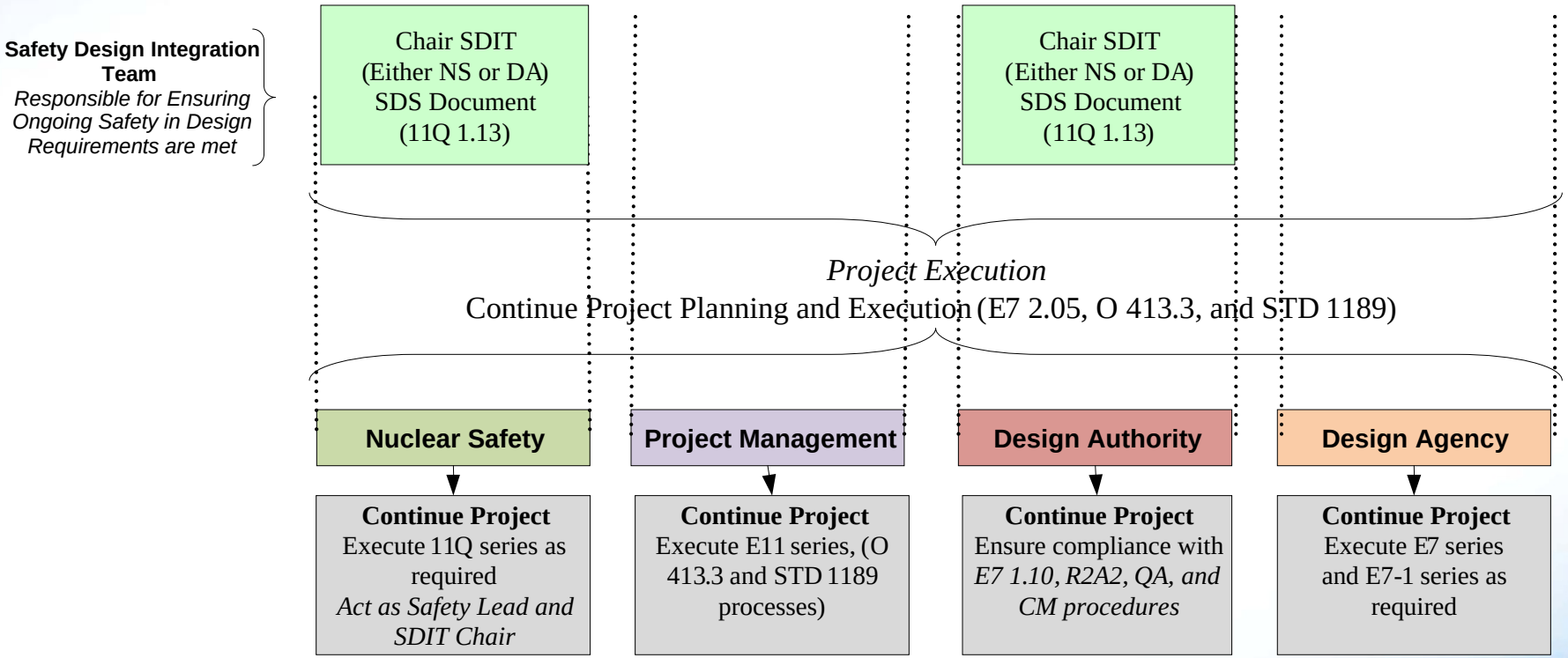
SRS CONTINUED EXECUTION



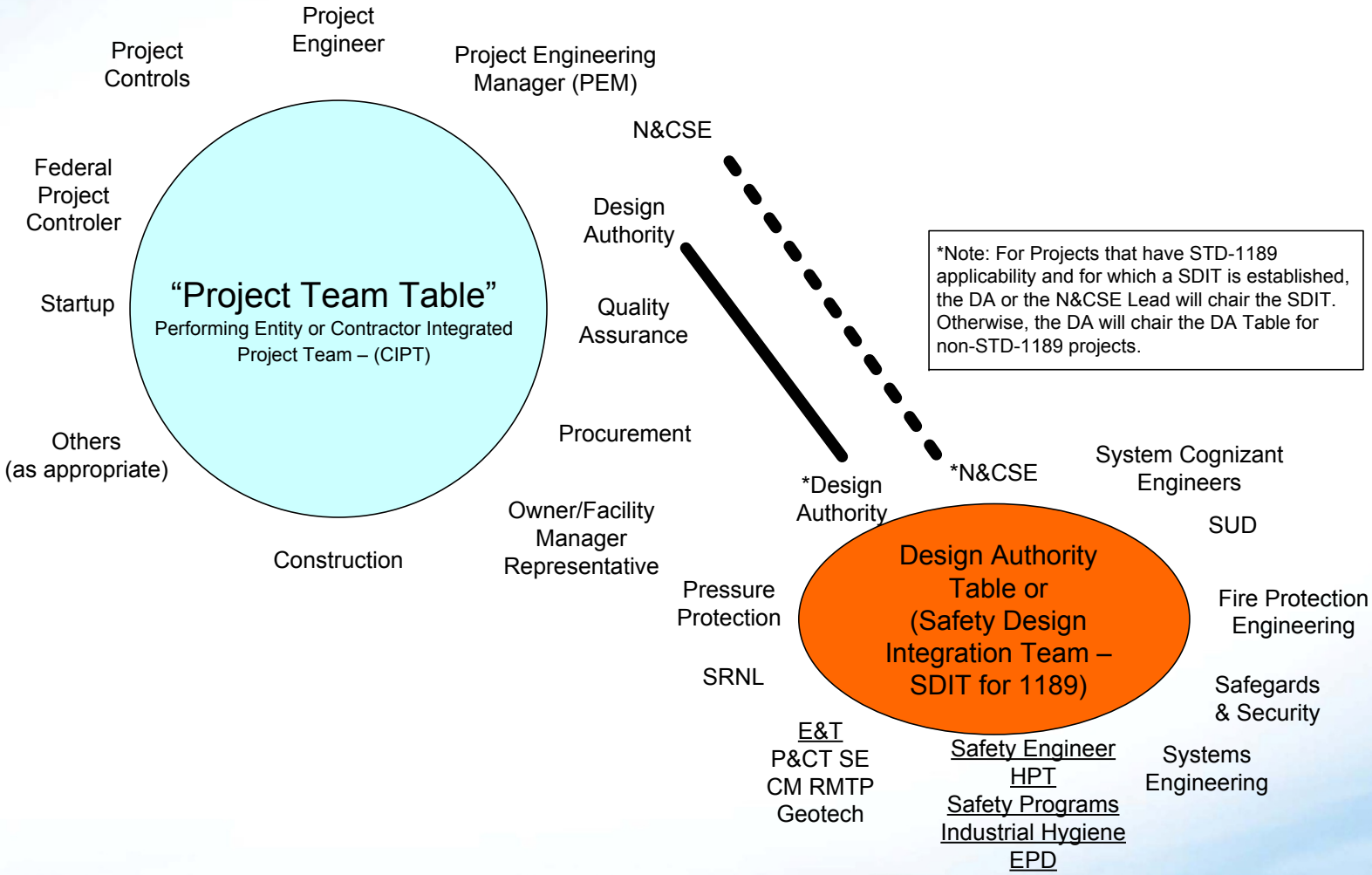
STD-1189 IMPLEMENTATION

- SRNS manuals directly affected by STD-1189 requirements:
  - E11, Conduct of Project Management & Controls
  - E7, Conduct of Engineering
  - 11Q, Facility Safety Document Manual
  - SCD-11, Consolidated Hazard Analysis Process (CHAP) Program and Methods Manual
  - Other lower level documents
    - e.g. Engr Stds 1060, 1061, DIDI-12, etc.
- SRNS Effective date August 14, 2009

E11 CONDUCT OF PROJECT MANAGEMENT AND CONTROL

From: *Savannah River Site R2A2 for Projects*, rev 4

The Design Authority "Small Table"



*Note: For Projects that have STD-1189 applicability and for which a SDIT is established, the DA or the N&CSE Lead will chair the SDIT. Otherwise, the DA will chair the DA Table for non-STD-1189 projects.

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DESIGN CRITERIA

Major Requirements for Facility Fire Walls

Document	Section	Requirement	Evaluation/Comments (Reference)
Fire Barrier Criteria			
DOE O 420.1B	II.3.a.3	Fire protection for DOE facilities, sites, activities, design, and construction must meet …	As documented in facility drawings, facility fire walls were designed in accordance with … (document reference)
	II.3.c.3	Complete fire-rated construction and barriers, commensurate with …	Facility fire walls are placed in accordance with fire analyses to … (document reference)
	Others	*As appropriate for the analyzed safety functions*	
DOE-STD-1066-99	9.2.1	Wall, floor and ceiling, and roof and ceiling assemblies should be tested and rated for their fire resistance …	As documented in component specifications, facility fire walls have been certified to meet their fire resistance rating by … (document reference)
	9.2.2	Fire Resistance - The development of an FHA and SAR should include consideration of conditions …	The hazard and accident analysis performed in the FHA and DSA took into consideration … (document reference)
	Others	*As appropriate for the analyzed safety functions*	
NFPA 221	All	Compliant	Consistent with the design criteria documents, facility fire walls have been designed in accordance with NFPA 221 (document reference)
Others codes and standards		*As appropriate for the analyzed safety functions*	
Natural Phenomena Hazard Performance Criteria			
DOE O 420.1B	IV.3.a.1	Facility SSCs must be designed, constructed, and operated to withstand NPH …	As documented in facility drawings, facility fire walls were designed in accordance with … (document reference)
DOE-STD-1020-2002	2.2	Select Performance Categories of structure, system, or component based on DOE G 420.1-2 and DOE-STD-1021.	Consistent with the methodology of DOE G 420.1-2 and DOE-STD-1021, facility fire walls have been designated as performance category … (document reference)

DESIGN CRITERIA CROSSWALK

Safety Requirement Specification provides a crosswalk for the following Key System Attributes:

- System / Component / Part
- SC / SS Function
- Failure
- Impact on SC / SS Function
- SC SS Requirement
- Selected Design Features or Attributes to Support the SC / SS Function
- SC / SS Design Criteria (From SRS Engineering Standards and Guides)

STD-1189 CHANGES E7 SYSTEMS ENGINEERING

- E7, 2.05, Modification Traveler
  - Added SBRA role that supports the DA when initiating STD-1189 requirements
  - Added to the 5.0 General section several paragraphs that describe how to implement STD-1189
  - Nuclear & Criticality Safety Engineering is on the Tech Agency list for the DA to consult when needed in developing the Mod Traveler and execution of STD-1189 requirements.
  - The existing Section 5.2.3 requires a Major Modification determination performed by the DA per 11Q, 1.12.
  - Major Modification screening is recorded on the MT

STD-1189 CHANGES E7 SYSTEMS ENGINEERING

- E7, 2.06, Temporary Modification
  - Added reference to the DATR that a positive USQ may lead to a Major Mod determination.
- E7, 2.15, Alternative Studies
  - Added reference to consider a modification's Technical Agency Identification Checklist for Alternative Studies team formation.
- E7, 2.25, Functional Classification
  - Added roles for DA, Safety Basis Regulatory Authority/ Project Safety Lead to finalize determination of system level functional classifications
  - Incorporates new criteria for determining SS and SC classifications (see SCD-11)

STD-1189 11Q MANUAL CHANGES (SAFETY)

- 11Q-1.12 Major Modification Determination
  - Changed the title to reflect the actual determination being performed by this procedure
  - Incorporated numerous references to the Preliminary SB documents required by STD-1189
  - Added responsibilities for new positions (SBRA, N&CSE Director) and revised/added responsibilities to implement STD-1189 activities
  - Revised the screening criteria to remove the $ criteria and replace it with a question on impact to the existing safety basis (per STD-1189)
  - Created new major modification evaluation form (screening is recorded on the Mod Traveler; evaluation is on a unique form, OSR 19-349). Courtesy copy sent to DOE.

STD-1189 11Q MANUAL CHANGES (SAFETY)

- 11Q-1.13 Safety Design Strategy
  - Created this procedure for development the Safety Design Strategy
  - Outlines the roles and responsibilities of the various organizations that are involved in development of the SDS
  - Discusses the development process, review and approval requirements, and change control of the SDS
  - Add key items to consider
- Desktop instruction, N&CSE-2008-0001 Configuration Management of Preliminary SB documents
  - Formal mechanism for PDSA change control
  - Plan to convert to 11Q-1.14

STD-1189 SCD-11 CHAP CHANGES

- Added Appendix K, *Integration of Safety into the Design process*
  - Enables use of SCD-11 in or outside of STD-1189 applicability (i.e., major modification or new construction of HC-2 or 3 nuclear facility).
- SCD-11 Appendix K refers users of the CHAP Manual to the following parts of STD-1189 directed toward their functions and responsibilities:
  - Chapter 4, *Hazard and Accident Analysis*;
  - Chapter 5, *Nuclear Safety Design Criteria*;
  - Chapter 6, *Safety Reports*;
  - Appendices A through D, which deal with safety SSC and seismic classifications; and
  - Appendix F, *Safety-in-Design Relationship with the Risk Management Plan*
  - Appendix G, *Hazards Analysis Table Development*.

STD-1189 SCD-11 CHAP CHANGES

- Some Notable Differences (inside / outside "STD-1189 space")
  - "Challenge EG" for MOI clearly defined (point of negotiation @ 5 Rem)
  - 100 Rem CW is Speed Limit (not "challenge" criteria)
  - X/Q defined for CW (not site specific data)
  - FW Consequences not Significant if able to Self Protect
  - Definition of "Worker" includes CW at 100 m fixed
  - Seismic Design Criteria (SDC) / Limit States (LS) (not Performance Category, PC)
  - Chemical Screening / Chemical Release Consequences more clearly defined
- *Additional Detailed Training for CHAP Leads and SCD-11 Users*