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DOE STANDARD

SAFETY SYSTEM OVERSIGHT
FUNCTIONAL AREA QUALIFICATION STANDARD

DOE Defense Nuclear Facilities Technical Personnel

U.S. Department of Energy
Washington, D.C. 20585

AREA TRNG

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APPROVAL

The Federal Technical Capabilities Panel is responsible for reviewing and approving Functional Area Qualification Standards (FAQS) for Department-wide application. Approval of this FAQS by the Federal Technical Capabilities Panel is indicated by the signature below.

Gabriel Pugh Digitally signed by Gabriel Pugh Date: 2021.10.20 20:31:28 -06'00'

10/20/2021

Gabriel M. Pugh, Chair
Federal Technical Capabilities Panel

Date

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DOE-STD-8000-2021

U.S. DEPARTMENT OF ENERGY
FUNCTIONAL AREA QUALIFICATION STANDARD

Safety System Oversight

PURPOSE

FAQS establish common performance competencies in key nuclear facility functional areas for personnel in the DOE Technical Qualification Program (TQP). This FAQS establishes a common set of performance competencies to ensure designated personnel have the technical competency to perform Safety System Oversight (SSO) duties and responsibilities. The content of this FAQS should be referenced and used as appropriate to develop vacancy announcements, crediting plans, interview questions, and other criteria associated with the recruitment, selection, and internal placement of personnel assigned this FAQS.

APPLICABILITY

The SSO FAQS establishes common performance competencies for DOE personnel who perform SSO duties and responsibilities. SSO personnel oversee contractor management of safety systems at DOE defense nuclear facilities and are responsible for overseeing assigned systems to ensure they will perform as required by the safety basis and other applicable requirements[1]. Appendix C, *Approaches for Deploying and Qualifying SSO Personnel*, outlines the different approaches for assigning personnel to provide oversight of safety systems and the qualification expectations for each of these approaches.

For ease of transportability of qualifications between DOE elements, Program and Field Offices must use this FAQS without modification or addition to the performance competency knowledge requirements. Satisfactory and documented attainment of the performance competencies in this FAQS ensures personnel possess the minimum requisite knowledge and skills to perform SSO duties and tasks common to the DOE enterprise. DOE O 426.1B, *Federal Technical Capabilities*, requires organization specific qualification standards (OSQS) to supplement this FAQS and establish unique performance competencies at the organization (headquarters, field element, site, or facility) level.

IMPLEMENTATION

This FAQS, derived from an SSO Job Task Analysis (JTA), is comprised of performance competencies based on task performance. Each performance competency includes knowledge requirements and any mandatory performance activities (MPA) that need to be completed in order to demonstrate the performance competency has been met. Evaluation guides have been developed that provide the expected level of knowledge that personnel assigned this FAQS

[1] DOE O 420.1C, Facility Safety, requires Field Element Managers to provide oversight of the implementation of the cognizant system engineer (CSE) program and the operability of associated safety systems within the CSE program. The personnel who are assigned this responsibility are typically referred to as SSOs.

must obtain for each related knowledge requirement and for designated qualifying officials (QO) who are responsible for verifying the attainment of these knowledge requirements. The evaluation guide for this FAQS is available through the DOE National Training Center (NTC) TQP SharePoint Site at: https://ntc.doe.gov/tqp/SitePages/Home.aspx.

The Integrated Nuclear Facility Oversight Duty Analysis completed in July of 2018, was used to establish the breadth of common nuclear facility topical areas (e.g., safety basis, maintenance, configuration management, etc.) covered in the SSO performance competencies. The depth of knowledge requirements was greater in the topical areas where the SSO was identified as lead for the related oversight tasks, compared to the depth of knowledge requirements for the same topical areas in the Facility Representative (FR) FAQS or Nuclear Safety Specialist (NSS) FAQS. The knowledge requirements in all the common nuclear facility topical areas were tailored to the specific knowledge that an SSO candidate needed to perform with the related tasks that were identified as mandatory performance activities (MPAs).

The performance competencies in this FAQS include unique DOE knowledge requirements that the candidate must obtain and then apply to specific job tasks that are identified as MPAs in this FAQS. The overall objective of the MPAs is to determine whether an SSO candidate can apply the related knowledge to satisfactorily perform the associated job tasks.

The MPAs listed in this FAQS are required to be satisfactorily performed only once. If during the performance of the MPA any of the evaluation criteria are not satisfactorily met, the designated QO may require the candidate to perform the MPA again. In these cases, satisfactory completion of the MPA only needs to be documented once. Some of the MPAs in this FAQS may also be included in the candidate's OSQS. In these cases, the designated QO only needs to sign verifying completion of the MPA once, as part of this FAQS or during completion of the OSQS.

SSO candidates should perform the MPAs listed in the FAQS within their normal work environment, such as in assigned facilities or areas where the associated mission work is being accomplished. Supervisors may use other options to facilitate completion the MPA requirements in cases where candidates cannot perform the MPAs exactly as written in their normal work environment within the required qualification timeframe. This could include performance of the MPA in a simulated environment or by making minor modifications to the MPA or MPA evaluation criteria to fit local conditions. The reason for any changes in the MPA or MPA evaluation criteria or changes in the method of performance (e.g., simulate or use of exercise materials instead of performing) must be documented by a designated qualification official with approval of the supervisor and local FTCP agent.

EVALUATION CRITERIA

Attainment of the performance competency knowledge requirements and MPAs listed in this FAQS must be documented per the TQP plan or policy of the specific organization qualifying the individual and the requirements in DOE O 426.1B, *Federal Technical Capabilities*.

Each performance competency includes knowledge requirements that need to be completed in order to demonstrate the performance competency has been met. Attainment of the performance competency knowledge requirements listed in this FAQS must be verified by a designated QO using one or a combination of the following methods listed in DOE O 426.1B:

- Satisfactory completion of a written examination
- Satisfactory completion of an oral evaluation
- Documented evaluation of equivalencies
- Completion of approved training courses that confirm attainment of specific knowledge requirements

A designated QO must also verify successful completion of the MPAs in this FAQS. The QO must verify that the evaluation criteria, including any organization specific requirements, were satisfactorily met during observation of the MPA and/or review of the results of the MPA. Satisfactory attainment of the performance competency knowledge requirements and MPAs contained in this FAQS must be documented using the SSO FAQS qualification card in the Electronic Technical Qualification Program (eTQP) at: https://etqp.ntc.doe.gov.

After verification of attainment of all the performance competency knowledge requirements and the MPAs in this FAQS, the participant must satisfactorily complete the final qualification activity requirements identified in DOE O 426.1B and any other applicable organization specific requirements, before being designated as a qualified SSO.

INITIAL QUALIFICATION AND CONTINUING TRAINING

Appendix A, *Initial Qualification Training Recommendations*, includes a list of NTC and other training courses that support attainment of the performance competency knowledge requirements and/or provide an opportunity for SSO candidates to practice performance of the MPAs in this FAQS.

Appendix B, *Core Competency Continuing Training Recommendations*, identifies the MPAs and associated knowledge requirements where continuing training should be completed during the nominal 5-year continuing training cycle following initial qualification. Currently available training courses that address the MPAs and supporting knowledge requirements where continuing training is recommended are also identified in Appendix B.

DUTIES AND RESPONSIBILITIES

The SSO Job Task Analysis and the Integrated Nuclear Facility Oversight Duty Area Analysis were used to determine the following duties, responsibilities and tasks that are included in the scope of this FAQS.

1. Conduct oversight activities to evaluate the ongoing operability of assigned safety systems.
2. Conduct oversight activities to evaluate the implementation of contractor's cognizant system engineer program[2].
3. Provide support to DOE FRs, NSSs, and functional area leads in conducting oversight

[2] DOE O 420.1C, Facility Safety, requires DOE contractors to establish a cognizant system engineer (CSE) program and provides the requirements for the CSE program. DOE O 420.1C also requires Field Element Managers to provide oversight for contractor CSE programs and the operability of associated safety systems.

activities[3] by evaluating the implementation of nuclear facility topical areas, such as the safety basis, the technical safety requirements, the nuclear facility maintenance program and the configuration management process for assigned safety systems.

4. Provide support to DOE functional area leads in conducting oversight activities by evaluating the implementation of processes that interface with and could potentially affect the operability of assigned safety systems, such as design and engineering, procurement, quality assurance, and work planning and control.

Position specific duties and responsibilities for SSO are contained in organization specific qualification standards (OSQS) and position descriptions. Appendix C, *Approaches for Deploying and Qualifying SSO Personnel,* provides guidance for identifying facility/system specific knowledge that should be included in the OSQS, dependent upon how a specific organization deploys their SSO personnel (e.g., by facility, by systems, or by a combination of facilities and systems).

BACKGROUND AND EXPERIENCE

The knowledge requirements and associated MPAs identified in the FAQS were developed based upon the assumption that candidates have the preferred education and experience levels identified below. Personnel assigned to complete this FAQS who do not meet these requirements may need additional developmental assignments and supporting training to satisfactorily complete this FAQS.

The preferred education and experience for SSO personnel are:

1. Education

SSO personnel should possess a scientific or engineering degree with a major in an academic area that supports the functional responsibilities of the position. Depending on which option in Appendix C an organization uses to deploy SSO personnel, a degree related to the types of systems the candidate will be overseeing may be necessary (e.g., an electrical engineering degree for electrical systems, a mechanical engineering degree for mechanical systems, etc.). Additionally, professional credentials (e.g., Professional Engineer) and industry certifications are desirable.

2. Experience

DOE, Military, and/or industry experience that would contribute to a candidate's ability to successfully complete the performance activities in this FAQS is desirable. This includes experience as a DOE FR, NSS, or program/project oversight of a specific engineering discipline, or contractor experience as a cognizant system engineer or design engineer. Experience should demonstrate a strong understanding of the operation, maintenance and design of DOE or industry safety systems and should be commensurate with the responsibilities, authority and duties of the assigned position. Specialized experience can be demonstrated through possession of the knowledge and skills outlined in this standard.

[3]Oversight activities include operational awareness activities, assessments and shadow assessments as defined in General Technical Base (GTB) Part B Qualification Standard.

REQUIRED PERFORMANCE COMPETENCIES

The performance competencies contained in this FAQS include knowledge requirements that are in addition to and distinct from the knowledge requirements contained in the General Technical Base (GTB) Part A and Part B Qualification Standard (QS). All SSO candidates completing initial qualification must satisfy the knowledge requirements of the GTB Part A QS and the knowledge requirements and MPAs in the GTB Part B QS prior to or in parallel with attaining the knowledge requirements for the performance competencies in this FAQS. Each performance competency defines the expected level of knowledge and performance an individual must attain to meet the intent of this standard. Each performance competency is further described by knowledge requirements and, if necessary, MPAs that describe the task(s) that must be demonstrated to meet the intent of the related performance competency.

Note 1: When regulations, DOE directives, or other industry standards are referenced in this FAQS, the most recent revision should be used. However, SSO candidates and QOs should also refer to the versions of requirements included in the local contract during the attainment and verification of related knowledge requirements. Any applicable knowledge requirements in predecessor documents that are not included in this FAQS should be included in the organization specific QS or continuing training program.

Note 2: If specific evaluation criteria are not identified for any of the MPAs in this FAQS, the following generic evaluation criteria should be used together with any local expectations, to verify acceptable completion of the particular MPA.

Generic MPA Evaluation Criteria

- Identify expectations (i.e., criteria) for the specific activity
- Compare results to expectations (criteria) and document conclusions
- Document the basis for any identified issues or recommendations
- Discuss, if applicable, how you would communicate results to appropriate federal and/or contractor personnel.

1. <u>Performance Competency #1.</u> SSO personnel must demonstrate knowledge of the safety basis program and related processes.

<u>Knowledge Requirements</u>

A. Documented Safety Analysis (DSA)

1) Identify the requirements which drive the development of safety basis documentation.
2) Discuss the purpose, scope and major tasks involved in the development of the DSA.
3) Discuss the overall format and content of the DSA.
4) Discuss the purpose and scope of safety control selection and classification.
5) Describe how to determine if safety class (SC) controls are required.
6) Describe how to determine if safety significant (SS) controls are required.

7) Discus how the hierarchy of controls factors into control selection.
8) Discuss the traceability of controls from the Hazard and Accident Analysis to the TSRs.
9) Define safety function, functional requirements, performance criteria, and design criteria.
10) Discuss how performance criteria relate to DSA-credited safety equipment surveillance requirements (SR).

B. Technical Safety Requirements (TSR)

1) Discuss the following sections of a TSR document including their purpose and scope:
   a. Use and Application
   b. Safety Limits
   c. Limiting Control Settings (LCS), Limiting Conditions for Operation (LCOs), and Surveillance Requirements (SR)
   d. Administrative Controls
   e. Design Features (DFs)
   f. Bases
2) Discuss the relationship between support systems and supported safety *structures, systems or components* (SSCs) and how this relationship is managed in the TSRs.

C. TSR Implementation

1) Discuss the differences between safety and non-safety SSCs, and how these differences in classification are implemented using the graded approach in the following areas:
   a. Preventive and corrective maintenance
   b. Modifications/design changes
   c. Procurement
   d. QA personnel involvement
2) Discuss the designation and purpose of TSR DFs and how verification of the performance of their safety function is accomplished.
3) Discuss the relationship between TSR SRs and safety system operability.
4) Discuss safety system interrelationships with other non-safety systems and the potential effects on safety system operability.
5) Discuss Implementation Verification Reviews (IVRs) including:
   a. Purpose of IVRs
   b. Timing of the IVR
   c. Scope of the IVR
   d. Methods of IVR performance

e. Verification of LCO, SR, and DF implementation

f. Relationship between IVRs and Readiness Assessments

D. Unreviewed Safety Question (USQ)

1) Discuss the USQ process to include the following:
   a. Identify the requirements which drive the development of the USQ process.
   b. Discuss the purpose, scope, and basic steps of the USQ process.
2) Discuss the information provided in DOE G 424.1, *Implementation Guide for Use in Addressing Unreviewed Safety Question (USQ) Requirements,* for the following topics:
   a. The types of changes that apply to the USQ process
   b. Integration of the USQ process into the facility's change control processes
   c. USQ screening
   d. Use of categorical exclusions
   e. USQ determinations
   f. USQ Contractor Procedures
   g. Training and Qualification of various roles in the USQ process

Mandatory Performance Activities (MPA)

MPA 1.1. Using the applicable DSA, identify and discuss the safety function, functional requirements, and performance criteria and how they were derived for at least one assigned safety system.

MPA 1.2. Using the applicable TSR, identify the LCO operability requirements, applicable modes, and SRs for at least one assigned safety system.

MPA 1.3. Review and evaluate a completed USQD related to an assigned Safety System.

MPA 1.4. Review and evaluate the adequacy of controls as a team member in at least one of the following activities:

1) DSA revision that includes a new/revised safety SSC control
2) TSR Initial Review or TSR revision with a new/revised safety SSC control
3) Evaluation of the Safety of the Situation (ESS) or Justifications for Continued Operation (JCO) Review with a new/revised safety SSC control

2. <u>Performance Competency #2.</u> SSO personnel must demonstrate knowledge of the maintenance program and configuration management process.

<u>Knowledge Requirements</u>

A. Maintenance

1) Discuss the application of DOE O 433.1B, *Maintenance Management Program for DOE Nuclear Facilities.*
2) Define each of the following maintenance related terms and explain their relationship to each other:
   a. Corrective
   b. Preventive
   c. Predictive
   d. Periodic
   e. Planned
   f. Reliability-centered
   g. Troubleshooting
3) Discuss typical maintenance performance indicators used to evaluate maintenance processes.
4) Explain the purpose and content of a master equipment list (MEL).
5) Describe the use of the MEL and use in the procurement, work control, and design change processes.
6) Explain the purpose of post-maintenance testing (PMT) and the relationship between PMT and system operability.

B. Configuration Management (CM)

1) Discuss CM requirements identified in DOE O 420.1C, *Facility Safety* and DOE O 433.1B, *Maintenance Management Program for DOE Nuclear Facilities.*
2) Discuss the application of DOE-STD-1073, *Configuration Management*.
3) Describe configuration control and its relationship to the maintenance work control process and the maintenance history file.
4) Discuss the purpose and applicability of system design description (SDDs) documents as described in DOE-STD-3024, *Content of System Design Descriptions*.
5) Describe the relationship of CM to safety basis documentation and requirements (DSAs and TSRs, including SDDs).
6) Explain the term "collocated SSCs" and the possible negative impacts on safety class or safety significant SSCs.
7) Distinguish the types of field activities that constitute a design change or modification from corrective or preventive maintenance.
8) Describe the roles and responsibilities of the Design Authority with respect to system configuration.
9) Explain the concept and requirements of using temporary modifications.
10) Explain how the Contractor maintains the configuration of the safety systems (both physical and document configuration) throughout the work control and design change processes.
11) Discuss the application of the graded approach to configuration management.

12) Discuss the meaning of Code of Record (COR) and how the COR is managed and revised.

3. <u>Performance Competency #3.</u> SSO personnel must demonstrate knowledge of the following programs and processes, and how they interface with and could potentially affect the continued operability and availability of safety SSCs.

<u>Knowledge Requirements</u>

A. Design and Engineering

1) Identify the DOE and Industry technical standards invoked by DOE O 420.1C and when each of the invoked standards are required to be used.
2) Identify the criteria for approving an equivalency to DOE technical standards and industry codes and standards and who is required to approve an equivalency.
3) Discuss the objective and applicability of Chapter 1, *Nuclear Safety Design Criteria*, of Attachment 2, *Facility Safety Requirements*, to DOE O 420.1C.
4) Discuss the following in DOE Standard 1189, *Integration of Safety into Design*
   a. Expectations for incorporating safety in the design process for new or major modifications to DOE Hazard Category 1, 2, and 3 facilities, *Integration of Safety into the Design*.
   b. Describe the process and criteria for determining whether a modification is a "major modification".
   c. Explain the purpose and approval process for a Safety Design Strategy (SDS).
   d. Explain the purpose and approval process for a Conceptual Safety Design Report (CSDR).
   e. Explain the purpose and approval process for a Risk and Opportunity Assessment (R&OA).
   f. Explain the purpose and approval process for a Preliminary Documented Safety Analysis (PDSA).
5) Discuss the following in DOE O 413.3B, *Program and Project Management for the Acquisition of Capital Assets.*
   a. Identify the project phases and Critical Decisions (CDs)
   b. Discuss how each of the safety-in-design documents required in DOE STD-1189, *Integration of Safety into the Design Process* (e.g., SDS, CSDR), relate to the project phases.
   c. Discuss the responsibilities of the federal Integrated Project Team.
   d. Discuss the relationship between Technology Readiness Levels, project phases, and safety-in-design documents.
6) Identify the six elements of defense in depth that must be included in nuclear facility design and discuss how they support the objective of the nuclear facility design requirement to provide multiple layers of protection.

7) Discuss the objective of the nuclear facility design requirement to confine uncontained radioactive materials and the elements that must be included as part of the nuclear facility confinement design.
8) Discuss the use of DOE G 420.1-A, *Nonreactor Nuclear Safety Design Guide for use with DOE O 420.1C, Facility Safety,* in evaluating nuclear facility confinement design.
9) Discuss other design requirements that may be applicable to the design of nuclear facilities and the methods and processes ensuring the integration of these design requirements into the overall nuclear facility design.
10) Discuss the requirements and identify any supporting industry standards for each of the following general design criteria in attachment 3, *Design Criteria for SSCs*, of DOE O 420.1C.
    a. Conservative Design Margins
    b. System Reliability
    c. Environmental Qualification
    d. Safe Failure Modes
    e. Support System and interface Design
    f. Protection against Fire
    g. Quality Assurance
11) Discuss the guidance provided in attachment 3 of DOE O 420.1C, for evaluating and selecting DOE technical standards and industry codes and standards, and identifying and using specific design criteria from these standards for inclusion in the design of specific types of safety systems.
12) Discuss how design and engineering processes interface with and support the following process and programs:
    a. Configuration Management
    b. Work Planning and Control
    c. Quality Assurance
    d. Procurement

MPA 3.1. Using the system design descriptions (SDD) or other available design documents (e.g., the COR) for an assigned safety system, verify the following:

Note: If the requirements of DOE O 420.1C do not apply to assigned systems, then use safety system design documentation for a major modification to an existing nuclear facility or a new nuclear facility.

1) The specific codes in Tables 1 through 7 of attachment 3 of DOE O 420.1C are included in the design documentation or an exemption has been documented and approved.
2) Any equivalencies to design requirements in the applicable codes identified in number 1 have been properly documented and approved using local procedures.

B. Procurement

1) Explain the process to identify, order, receive, store, and install proper parts and materials for work activities while meeting all quality requirements.
2) Explain how safety-related parts and components are properly controlled, segregated, identified, and issued.
3) Discuss aspects of safety-related parts/services procured under an American Society of Mechanical Engineers (ASME) Nuclear Quality Assurance (NQA-1) certification program, and those procured through the commercial-grade dedication process.
4) Describe the suspect/counterfeit item (S/CI) concerns that should be addressed during the procurement process.

C. Quality Assurance

1) Discuss the Purpose, Scope, and Regulatory and/or DOE Directive requirements for a Nuclear Facility Quality Assurance (QA) Program.
2) Describe the relationship between 10 CFR 830, DOE O 414.1D, *Quality Assurance*, and NQA-1 for implementing a nuclear facility QA program.
3) Discuss the purpose of a nonconformance report (NCR).
4) Give examples of conditions which would warrant the generation of an NCR.
5) Discuss the meaning of a conditional release for an item which has an associated NCR.
6) Discuss the possible dispositions of an NCR:
    a. Rework
    b. Repair
    c. Use-As-Is
    d. Reject
7) Discuss when a conditional release of an NCR, and the disposition of an NCR, would be expected to result in a formal technical evaluation (ex: USQ, Operability Determination, etc.).
8) Discuss the requirements for safety system software contained in DOE O 414.1D.
9) Discuss the types of software usages that are included in definition of safety system software.
10) Describe the safety software quality assurance requirements for DOE nuclear facilities.

D. Work Planning and Control (WP&C)

1) Using DOE-HDBK-1211, *Activity-Level Work Planning and Control Implementation*, explain the basic elements of the WP&C implementation process.
2) Discuss the basic roles and responsibilities of key personnel involved in the WP&C process.
3) Discuss the interfaces between WP&C implementation and Conduct of Operations (DOE O 422.1).

4) Explain the application of tailoring and the graded approach to WP&C.
5) Explain the importance of identifying and screening impacts on the TSRs, changing modes of facility operation, and entrances to limiting controls for operations (LCOs) during the early planning of work activities.
6) Discuss the principles of effective troubleshooting, including the potential pitfalls of unrestrained troubleshooting activities.
7) Explain the basic process for developing a job hazards analysis (JHA) or job safety analysis (JSA).
8) Explain the considerations necessary to ensure that work activities are scheduled and authorized according to priorities and available resources.
9) Explain the steps involved in the preparation and release/authorization of work.
10) Explain the purpose and scope of pre-job briefings.
11) Discuss hazards that would require tasks to be stopped for imminent danger to the health and safety of workers and the public, and for potential impact to the environment.
12) Discuss post-job reviews and provide examples of post-job feedback.

4. <u>Performance Competency #4.</u> SSO personnel shall evaluate the operability of assigned safety SSCs.

<u>Knowledge Requirements</u>

A. Discuss the type of oversight activities that should be routinely conducted to independently evaluate operability of assigned safety SSCs.
B. Describe the relationship and interface of SSO's with other DOE oversight personnel and with contractor personnel.
C. Discuss the application of baseline, supplemental, and reactive oversight in the SSO's role.
D. Discuss considerations for adjusting the level and mix of oversight activities in the SSO's oversight role.
E. Discuss the types of oversight data that should be provided by the Contractor Assurance System to demonstrate operability of assigned safety systems for the following topics:
    1) Self-Assessment Program
    2) Causal Analysis and Extent of Condition (EOC) Reviews
    3) Lessons Learned/Feedback and Improvement Program
    4) Program Performance Measures (Dashboard)
F. Discuss the type of oversight activities that other Federal oversight personnel conduct that support the ongoing evaluation of safety system operability.
G. Discuss the potential impacts of safety system aging degradation and technical obsolescence on the following:
    1) Maintenance activities
    2) Procurement activities

3) Modification activities

4) System operation and reliability

H. Define reliability, availability, maintainability and operability and their relationship to each other. Describe where safety system performance expectations are documented.

I. Discuss the purpose and use of operability determinations (or equivalent evaluations).

J. Identify the conditions and supporting processes that would typically warrant an evaluation of system operability.

K. Discuss the potential outcomes of an evaluation of system operability.

MPA 4.1. Perform and document results of at least one of the following operational awareness activities for assigned safety system:

1) Observe and evaluate a troubleshooting activity

2) Observe and evaluate a post maintenance testing activity

3) Observe and evaluate completion of an LCO surveillance requirement

MPA 4.2. Perform and document the results of at least one of the following activities for an assigned safety system:

1) Safety system configuration management walk down

2) Safety system assessment

MPA 4.3. Evaluate the adequacy of a work package associated with performing maintenance, repair, or testing of an assigned safety system.

MPA 4.4. Review and evaluate the contractor's documented evaluation of system operability.

MPA 4.5. Review and evaluate the adequacy of safety system controls as a team member, on at least one of the following activities:

1) Implementation Verification Review

2) Readiness Assessment involving new/revised TSR controls

MPA Evaluation Criteria

A. Establish review criteria for the selected activity based on requirements and overall performance objective to confirm operability of safety SSC.

B. Identify and document the results of review.

C. Identify any changes in planned oversight activities based on the results of the review, if applicable.

5. Performance Competency #5. SSO personnel shall evaluate the performance of the contractor's cognizant system engineer (CSE) program in assuring operability of assigned safety SSCs.

Knowledge Requirements

A. Discuss the applicability of a CSE program per DOE O 420.1C.

B. Discuss the requirements for DOE oversight of the CSE program in DOE O 420.1C.

C. Discuss the following required elements of the CSE program:

   1) CSE program coverage

   2) CSE requirements regarding configuration management

   3) CSE requirements for support to Operations and Maintenance

   4) CSE qualification requirements

D. Describe DOE expectations for the contractor's system health reports and how the information in these reports should be used as part of an SSO's oversight activities.

E. Describe expectations for the CSE to perform safety system walk downs and how safety system walk downs relate to configuration management and ensuring the operability of safety SSCs.

F. Discuss the performance measures/metrics that can be used to evaluate safety system performance.

MPA 5.1. Conduct at least one of the following operational awareness activities for assigned safety systems.

1) Review and evaluate a periodic system health report.

2) Observe and evaluate a periodic system performance review meeting.

3) Observe/Shadow a contractor-led safety system assessment.

APPENDIX A

INITIAL QUALIFICATION TRAINING RECOMMENDATIONS

Table A.1, *Initial Qualification Training Recommendations*, provides a list of NTC training courses that support attainment of the performance competency knowledge requirements in this FAQS and also provide an opportunity for SSO Personnel to practice performance of the MPAs in this FAQS.

Note: Refer to the NTC safety training course catalog at https://ntc.doe.gov/student/stp to verify the currently available courses and their titles.

Table A.1. Initial Qualification Training Recommendations	
Performance Competency (PC) Knowledge Requirements and MPAs	**Initial Training Recommendations**
PC #1 – Safety Basis and Related Processes	
Documented Safety Analysis	SBA-110DE, *Nuclear Facility Safety Basis Fundamentals* SBA-120DE, *Hazard Identification, Categorization, and Evaluation Fundamentals* SBA-130DE, *Accident Analysis and Control Selection*
Technical Safety Requirements	SBA-150DE, *TSR Development* FOO-222, *Technical Safety Requirements Implementation*
TSR Implementation	SBA-150DE, *TSR Development* FOO-222, *Technical Safety Requirements Implementation* FOO-210, *Conduct of Maintenance* FOO-240, *Fundamentals of Work Planning and Control* SMP-200, *Safety System Oversight Duties and Responsibilities*
Unreviewed Safety Question	SBA-160DE, *USQ Process* SBA-250, *USQ Process Implementation Review*
MPA 1.1. *Identify and Discuss Safety Function, Functional Requirements, and Performance Criteria Derivation*	SBA-120DE, *Hazard Identification, Categorization, and Evaluation Fundamentals* SBA-130DE, *Accident Analysis and Control Selection*
MPA 1.2. *Identify TSR Operability, Modes, and SRs*	FOO-222, *Technical Safety Requirements Implementation*
MPA 1.3. *Review USQD for Safety System*	SBA-160DE, *USQ Process* SBA-250, *USQ Process Implementation Review*
MPA 1.4. *Review Control Adequacy*	SBA-150DE, *TSR Development* FOO-222, *Technical Safety Requirements Implementation*

PC #2 – Maintenance and Configuration Management	
Maintenance	FOO-210, *Conduct of Maintenance*
Configuration Management	FOO-230, *Configuration Management*
PC #3 – Programs and Processes	
Design and Engineering	SBA-140DE, *Safety Design Basis Document Development*
Procurement	FOO-210, *Conduct of Maintenance* SMP-200, *Safety System Oversight Duties and Responsibilities*
Quality Assurance	SMP-200, *Safety System Oversight Duties and Responsibilities*
Work Planning & Control	FOO-240, *Fundamentals of Work Planning and Control*
MPA 3.1. Verify applicable industry codes and standards were properly identified in design documentation for an assigned safety system	
PC#4 – SSC Operability	
DOE Nuclear Facility Oversight Framework	DOE-120, *DOE Oversight and Implementation*
Evaluation of Contractor Assurance System and Oversight	DOE-120, *DOE Oversight and Implementation* DOE-145, *Oversight for Supervisors*
Aging Degradation/Technical Obsolescence	FOO-210, *Conduct of Maintenance*
RAM and Operability	SMP-200, *Safety System Oversight Duties and Responsibilities*
MPA 4.1. *Safety System Operational Awareness*	DOE-120, *DOE Oversight and Implementation*
MPA 4.2. *Safety System Walk Down or Assessment*	DOE-215, *Assessment Preparation and Application*
MPA 4.3. *Safety System Work Package Review*	FOO-210, *Conduct of Maintenance* FOO-240, *Fundamentals of Work Planning and Control*
MPA 4.4. *Safety System Operability Evaluation*	FOO-222, *Technical Safety Requirements Implementation*
MPA 4.5. *Verify controls during Independent Verification Review or Readiness Activity*	
PC #5 – Cognizant System Engineer Program	
All Knowledge Requirements	SMP-200, *Safety System Oversight Duties and Responsibilities*
MPA 5.1. *CSE Program Oversight*	SMP-200, *Safety System Oversight Duties and Responsibilities*

APPENDIX B

CORE COMPETENCY CONTINUING TRAINING RECOMMENDATIONS

Table B1, *Core Competency Continuing Training Recommendations*, includes the continuing training recommendation and supporting NTC courses based on an analysis of the difficulty, importance, and frequency of the MPAs in this FAQS. The recommended courses in this table should be used to meet the requirement in DOE O426.1B that at least 40 hours of continuing training must be related to the competencies in the participants assigned FAQS. The remainder of the 80 hours of continuing training over the nominal 5-year cycle, typically referred to as the flexible continuing training component, should include training topics on site/facility/system competencies included in the participants OSQS. Appendix C provides some additional guidance on initial continuing training associated with the competencies in the OSQS.

Table B1 Core Competency Continuing Training (CT) Recommendations

Performance Competency (PC) and MPAs	**CT Recommendations and Recommended Courses**
PC # 1 Safety Basis and Related Processes MPAs 1.1, 1.2, 1.3, and 1.4	CT Recommendation - All Knowledge Requirements - MPA 1.4. Recommended Courses - SBA-110DE, *Nuclear Facility Safety Basis Fundamentals* - SBA-120DE, *Hazard Identification, Categorization, and Evaluation Fundamentals* - SBA-130DE, *Accident Analysis and Control Selection* - SBA-150DE, *TSR Development* - SBA-160DE, *USQ Process* - FOO-222, *Technical Safety Requirements Implementation* (MPA 1.4)
PC #2 Maintenance and Configuration Management No MPAs	CT Recommendation - None (Initial Training Only)
PC #3 Programs and Processes MPA 3.1	CT Recommendation - None (Initial Training Only)

PC #4 SSC Operability MPAs 4.1, 4.2, 4.3, and 4.4	CT Recommendation - All Knowledge Requirements - MPAs 4.2. and 4.4 Recommended Courses - DOE-120, *DOE Oversight and Implementation* - FOO-210, *Conduct of Maintenance* - FOO -230, *Configuration Management* - FOO-240, *Fundamentals of Work Planning and Control* - DOE-215, *Assessment Preparation and Application (MPA 4.2)* - FOO-222, *Technical Safety Requirements Implementation (MPA 4.4)*
PC #5 Cognizant System Engineer Program MPA 5.1	CT Recommendation - All Knowledge Requirements Only Recommended Courses - SMP-200, *Safety System Oversight Duties and Responsibilities*

APPENDIX C

Approaches for Deploying and Qualifying SSO Personnel

General Implementing Guidance

Typically for sites with credited safety systems in nuclear facilities at least one person is qualified as an SSO using either options 1 or 2 below. This normally applies to sites that have DOE O 420.1C, *Facility Safety*, in the operating contract which requires the Field Element Manager to provide oversight of the Cognizant System Engineer Program and the safety systems within that the program.

Option 3 may be used to augment qualified SSOs for specific nuclear facility safety systems, as well as any safety systems in non-nuclear facilities (e.g., accelerators, high explosive facilities, chemical processing facilities, etc.). Option 3 may be solely used to provide safety system oversight for sites that do not have any credited nuclear facility safety systems.

Section 4.1.1, *Safety System Operability*, of DOE G 226.1-2A, *Federal Line Management Oversight of DOE Nuclear Facilities*, includes guidance and general expectations for using SSO personnel to provide oversight of the core performance area of safety system operability. This guide should also be used to help determine the options below for deploying and qualifying SSO personnel.

Option 1 – Personnel are assigned the SSO FAQS as their Primary Qualification Standard

In this option, SSO personnel complete the required GTB Parts A and B and then the SSO FAQS as their primary qualification standard. This option is for SSO personnel whose primary duty is providing oversight of nuclear facility safety systems, either across the site for one or more safety systems or multiple safety systems within one or more nuclear facilities. In this option, the OSQS should contain content in the following three (3) areas:

Part A. *Engineering Fundamentals Knowledge*

Content

If the SSO is responsible for covering common types of systems (e.g., electrical, mechanical, I&C, etc.), the set of engineering fundamental knowledge that the SSO needs to have for their assigned systems should be identified. Organizations should refer to the discipline specific FAQS [4] to help identify the specific set of knowledge that should be verified. If the SSO is responsible for several different types of safety systems within one or more nuclear facilities, the organization should also refer to appendices A and B in the FR FAQS to help identify any additional knowledge that should be verified.

Organizations should also consider including in this section knowledge related to the voluntary consensus standards applicable to the type of assigned safety systems. The key voluntary consensus standards based on engineering disciplines are identified in attachment 3, *Design Criteria for Safety SSCs*, to DOE O 420.1C, *Facility Safety*.

[4] These include the current or archived versions of the following FAQS: Civil and Structural Engineering (DOE-STD-1182-2014); Confinement Ventilation and Process Gas Treatment (DOE-STD-1168-2013); Electrical Systems and Safety Oversight (DOE-STD-1170-2007); Fire Protection Engineering (DOE-STD-1137-2014); Instrumentation and Control (DOE-STD-1162-2013); Mechanical Systems (DOE-STD-1161-2008); Radiation Protection (DOE-STD-1174-2013).

Verification Method
Verification of the knowledge in this section may be done in several ways (oral interviews, knowledge quizzes, equivalencies, or a combination of these), and the depth and breadth of the verification should factor in the individual's education, experience, other qualifications[5], and any certifications. This verification is similar to Appendix A of the FR FAQS, where a single sign off by a designated QO may be used.

Part B. *Site/Organization Specific Implementing Procedure Knowledge*

Content
This section should identify local implementing procedures, manuals, and processes that individuals should be familiar with to perform all the SSO duties and responsibilities in this FAQS, such as the following:

- USQ procedure
- CM process
- WP&C procedures, including processes and forms for completing Job Hazard Analysis
- Engineering Manuals
- CSE program description document

Verification
This set of knowledge should typically be verified either through a list of required reading that the participant signs off as having completed, or it can be incorporated into the verification of completion of one of the related MPAs in the SSO FAQS, such as the review and evaluation of a completed USQD.

In some cases, it may be appropriate to identify key elements or details of these implementing procedures that the SSO candidate should be able to describe, discuss, explain, or identify to a designated qualifying official.

Part C. *Facility/System Specific Knowledge*

Content
For SSOs who are responsible for multiple safety systems in one or more nuclear facilities this section should include facility specific knowledge that is typically included in the site-specific qualification standard for the assigned FR for the facility. This generally includes information in chapter 4 of the associated DSA that is important to understand credited safety systems. This section would also include any required local training for facility access.

For all SSOs regardless of how they are deployed (either by facility, or by system across the site) this section should also include the following types of information for each assigned safety system [6]

- Identify and describe the function and purpose of the assigned safety systems and major components and how these functions support the full spectrum of system operations.
- Given the major design basis supporting analyses, system design descriptions, calculations and other information sources, explain how system performance

[5] Other qualifications where granting an equivalency for this section of knowledge should be considered include commercial and Naval Nuclear Power qualifications, and any of the qualifications standards listed in footnote 1 depending on the types of assigned systems.
[6] For SSOs that are assigned multiple safety systems, either within a single nuclear facility or across the site, this section does have to include all the assigned safety systems for initial qualification. In these cases, there should be appendices for each safety system within the nuclear facility that can be assigned as the SSO gains experience and is given more responsibility.

requirements satisfy the safety analysis.

- Describe the maintenance requirements of the safety system and how to determine the status and adequacy of contractor maintenance activities.
- Describe the effect of aging on safety system equipment and components, if any, and how it is addressed.
- Identify and describe the function and purpose of any associated limiting control settings (LCSs) or limiting conditions for operations (LCOs), specific administrative controls (SACs), or Design Features.
- Discuss any associated surveillance requirements (SR) including how the SR verifies operability of the SSC and the basis for the SR frequency.

Verification
The verification of safety system knowledge requirements may be completed using one or a combination of the following three methods by a designated qualifying official:

- Separate verification of knowledge requirements. This can be done using one or a combination of the normal verification methods – observation, oral interview, or knowledge quiz. Additionally, the oral interview may be conducted in the field during a system walk down.
- Incorporate the knowledge requirements into applicable MPA(s) in SSO FAQS core competencies.
- Incorporate the knowledge requirements into a final evaluated walkthrough that is the minimum required final qualification activity for SSOs[7].

Option 2 – Personnel are assigned the SSO FAQS as a Secondary Qualification

In this option, personnel complete their primary functional area qualification and the SSO FAQS is assigned as a secondary qualification. This is most commonly used for personnel whose primary qualification is as a Facility Representative (FR) or as a Nuclear Safety Specialists (NSS) and they are also performing SSO duties and responsibilities for specific safety systems. The next most common situation are personnel whose primary job duties and responsibilities are providing oversight of a safety management program (e.g., Fire Protection, Radiation Protection, Criticality Safety, etc.) and they are also performing SSO duties and responsibilities for safety systems in these functional areas.

In these cases, after completing their primary qualification standards (this includes GTB Parts A and B and the applicable FAQS [FR, NSS, Fire Protection, etc.]), personnel should be granted equivalencies for any competencies in the SSO FAQS that were already attained as part of their primary qualification standard (i.e., FR, NSS, Fire Protection, etc.), and complete the remaining competencies using the normal competency verification process.

For qualified FRs and NSS who are also qualifying as SSOs, a competency analysis was completed that identifies competencies in the FR and NSS FAQS that are equivalent to the SSO FAQS competencies. This competency analysis is available on the FTCP Support Program's SharePoint Site to assist in identifying and granting approval of equivalencies. To streamline the qualification process, an "FR SSO Gap Card" and "NSS SSO Gap Card" have also been pre-loaded into eTQP for assignment to qualified FRs or NSS who are also completing the SSO FAQS. These gap cards only include the competencies in the SSO FAQS that must be

[7] DOE O 426.1B, section 4.f (3) (b) 4 requires as a minimum, satisfactory completion of an evaluated facility walkthrough as the final qualification activity.

completed using the normal competency verification process and do not require the approval of any equivalencies.

The OSQS for this option should include the same content (engineering fundamentals knowledge, site specific implementing procedure and process knowledge, and system specific knowledge) described in Option 1. The following provides some additional guidance for the content and verification of the knowledge in these sections for personnel using this option.

Section A. *Engineering Fundamentals Knowledge*

This section may be omitted if an individual's primary qualification standard includes engineering fundamental knowledge applicable to their safety systems (see footnotes in Option 1).

Section B. *Site/Organization Specific Implementing Procedure Knowledge*

If the individual is to be considered a "qualified" SSO, then this section should cover site specific knowledge of the procedures and processes for all the SSO core duties and responsibilities identified in the SSO FAQS which is the same as Option 1.

Section C. *Facility/System Specific Knowledge*

This section should cover the system knowledge the same as Option 1. If the system knowledge is covered in their primary qualification standard then an equivalency may be granted, or this section may be tailored based on the individual's qualifications and experience.

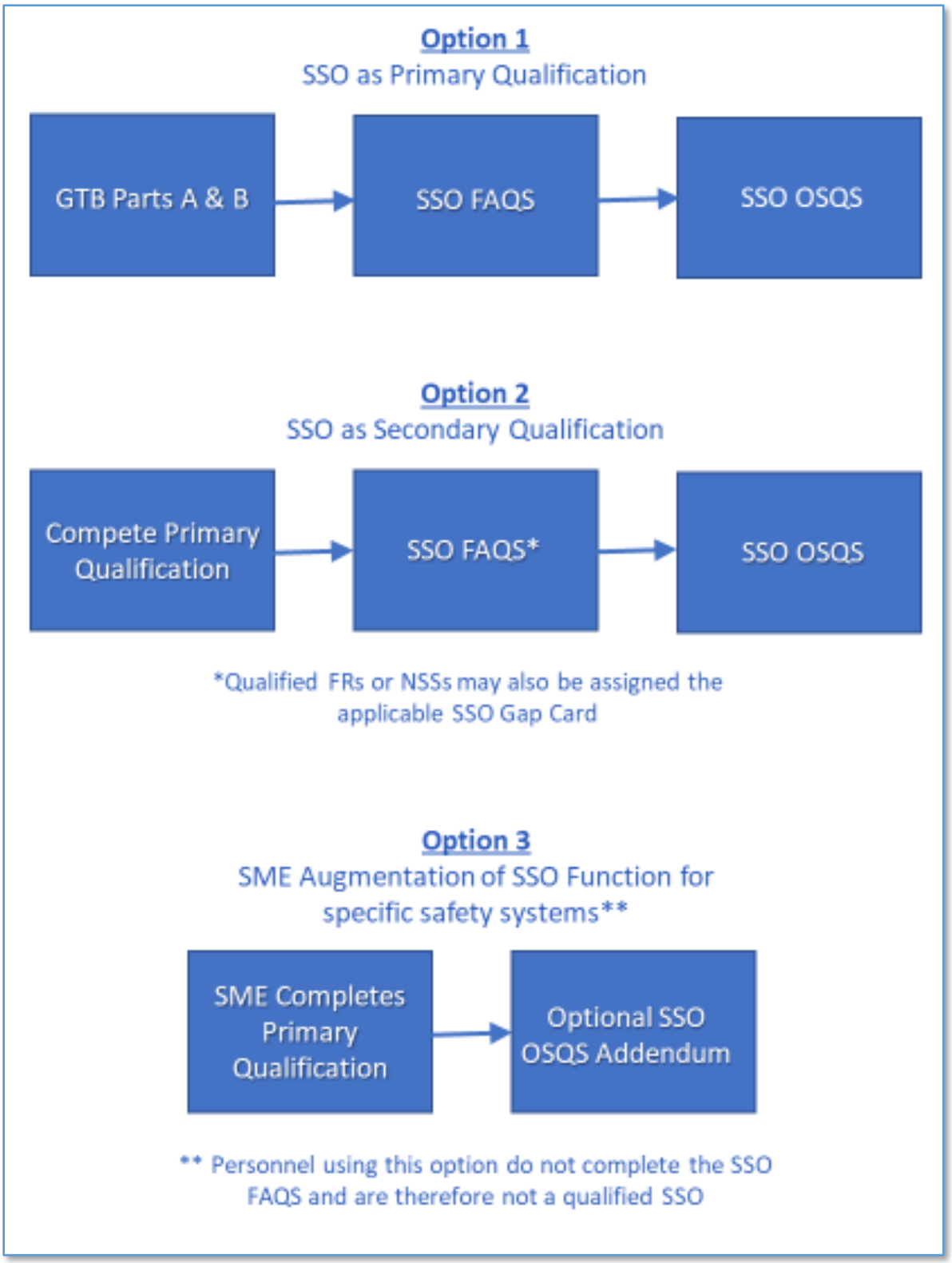
Option 3 – Assign a subject-matter expert (SME) to augment qualified SSOs (either through option 1 or option 2), by providing oversight of specific safety system(s).

This option involves assigning a SME to augment qualified SSOs (using either options 1 or 2 above), to provide oversight of a specific safety system or systems. This option may be used to provide oversight of a single or small set of safety systems that a particular individual has the competency to cover through their unique training, experience, and education. In some cases, the individual may also have completed a qualification in their area of expertise, such as Radiation Protection, Criticality Safety, Explosive Safety, etc.

Personnel who are assigned as SMEs for a particular safety system using this option typically only perform a specific subset of the SSO duties and responsibilities in this FAQS (e.g., conducting periodic assessments of a particular system), and therefore they are not expected to complete the SSO FAQS and the three (3) sections of knowledge for the SSO OSQS identified in options 1 and 2.[8] However, personnel performing limited SSO duties and responsibilities using this option may be assigned an addendum to their OSQS that includes the applicable knowledge for the SSO OSQS identified in options 1 and 2. This is referred to as a "OSQS Addendum" in the flowchart below.

[8] Since personnel using option 3 are not expected to complete the SSO FAQS they are not considered a qualified SSO for transportability purposes. To be recognized as a qualified SSO within the DOE the SSO FAQS must be completed as outlined in Options 1 and 2 above.

SSO Deployment and Qualification Approaches Flowchart



CONCLUDING MATERIAL

Review Activity:
EM
NNSA
NE
SC
EA

Preparing Activity:
EA-50

Project Number:
TRNG: DEV
DOE-STD-8000-2021

Field and Operations Offices:
CBFO
CH
ID
OH
OR
ORP
RL
SR

Field or Site Offices:
Argonne Site Office
Brookhaven Site Office
Fermi Site Office
Kansas City Field Office
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