U.S. Department of Energy
Oak Ridge Office

Safety System Oversight
Office/Facility-Specific
Qualification Standard
Revision 0

June 2005

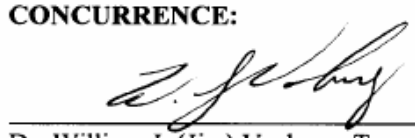
CONCURRENCE AND APPROVAL

The Department of Energy (DOE) Oak Ridge Office (ORO) Assistant Manager for Environment, Safety, and Health (AMESH) is the sponsor for this Safety System Oversight Office-Specific Qualification Standard. The AMESH management team is responsible for reviewing the qualification standard to ensure that the technical content is accurate and adequate for its intended application and for ensuring that the qualification standard is maintained current.

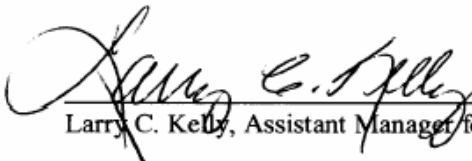
The Training and Development Group (TDG) Team Leader coordinates implementation of the Technical Qualification Program (TQP) and assists line managers in the development of ORO office/facility-specific qualification standards. The TDG Team Leader's concurrence with this qualification standard is indicated by his signature below. Local and DOE-wide implementation of the TQP is overseen by the Federal Technical Capability Program (FTCP) Panel. The Assistant Manager for Environment, Safety, and Health and ORO's agent to the DOE FTCP Panel also concur with this standard, as indicated by their signatures below.

The approval of this qualification standard is indicated by the ORO Manager's signature below.

CONCURRENCE:



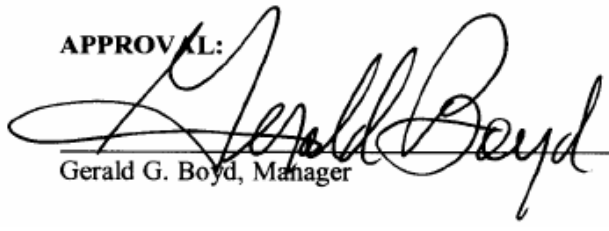
Dr. William J. (Jim) Vosburg, Team Leader, Training and Development Group — 6-10-05 — Date



Larry C. Kelly, Assistant Manager for Environment, Safety, and Health — 6-10-05 — Date

Robert J. Brown, ORO Agent to the DOE FTCP Panel — 6/15/05 — Date

APPROVAL:



Gerald G. Boyd, Manager — 6/20/05 — Date

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DOE Oak Ridge Office
Safety System Oversight
Office/Facility-Specific Qualification Standard

Background

Safety System Oversight (SSO) personnel are a key technical resource assigned to oversee contractor management of safety systems at DOE ORO defense nuclear facilities. Unlike Facility Representatives who are responsible for monitoring the safety performance of DOE defense nuclear facilities and day-to-day operational status, personnel assigned this position are responsible for overseeing assigned systems to ensure they will perform as required by the safety basis and other applicable requirements. SSO personnel are highly qualified individuals who perform assessments and investigations to confirm performance of assigned safety systems in meeting established safety and mission requirements. DOE ORO line management is responsible for safety at DOE facilities and for meeting mission objectives and goals. Integrated Safety Management (ISM) System processes help to ensure systems are able to perform their design safety functions. Effective implementation of ISM relies upon the ability to apply engineering expertise to maintain safety system configuration and assess system condition and effectiveness of safety management program implementation. ORO SSO personnel are knowledgeable of assigned systems and the contractor's application of the system engineer concept and safety program management as described in DOE Order 420.1A, *Facility Safety*. The Safety System Oversight qualification process, as a component of the ORO Technical Qualification Program (TQP), is considered an additional level of technical qualification that builds upon technical discipline competencies.

Purpose

The purpose of SSO qualification is to ensure that a sufficient number of competent ORO staff personnel are assigned to oversee contractor management of safety systems at DOE ORO defense nuclear facilities. SSO personnel shall be qualified by education, experience, and/or training to carry out the duties and responsibilities of the position. SSO personnel should possess a working knowledge of their assigned safety systems and the contractor's application of the cognizant system engineer concept and safety management program.

Applicability

This Standard applies to those ORO organizations with responsibilities for oversight of defense nuclear facilities that rely upon safety structures, systems, and components described in Documented Safety Analyses and Technical Safety requirements in accordance with 10 CFR 830, Subpart B.

Implementation

This technical Qualification Standard identifies the minimum technical competency requirements for ORO SSO personnel. Although there are other competency requirements associated with the positions held by ORO personnel, this Qualification Standard is limited to identifying the specific technical competencies associated with the SSO position. The competency statements define the expected levels (described below) of knowledge and/or skill that an individual must attain. Each of the competency statements is further explained by a listing of supporting knowledge and/or skill statements.

> **Familiarity level** is defined as basic knowledge of or exposure to the subject or process adequate to discuss the subject or process with individuals of greater knowledge.
>
> **Working level** is defined as the knowledge required to monitor and assess operations/activities, to apply standards of acceptable performance, and to reference appropriate materials and/or expert advice as required to ensure the safety of Departmental activities.
>
> **Expert level** is defined as a comprehensive, intensive knowledge of the subject or process sufficient to provide advice in the absence of procedural guidance.
>
> **Demonstrate the ability** is defined as the actual performance of a task or activity in accordance with policy, procedures, guidelines, and/or accepted industry or Department practices.

Training will be provided to those SSO personnel who do not meet the competencies contained in the this Qualification Standard. Training may include, but is not limited to, formal classroom and computer based courses, self-study, mentoring, on the job training, and special assignments. The training will be based upon the appropriate supporting knowledge and/or skill statements listed for each of the competency statements. Line and training management should use the supporting knowledge and/or skill statements as a basis for evaluating the content of any training used to provide individuals with the requisite knowledge and/or skill required to meet the Qualification Standard competency statements.

TQP participants input, track and report their technical qualification competency information through DOE's web-based Employee Self Service (ESS) program. The reports are sent to ORO's Training and Development Group (TDG) for input into a centralized database.

Participants should read the ORO TQP Manual prior to inputting information in ESS. The TQP Manual and other TQP resources are available through the TDG web site.

Evaluation Requirements

Attainment of the competencies listed in this Qualification Standard should be documented by a qualifying official, immediate supervisor, or the team leader in accordance with the ORO TQP Manual. The specific attainment methods, as described in the ORO TQP Manual, may include the following:

- Satisfactory completion of a facility-specific or safety-system-specific qualification card;
- Satisfactory completion of a written examination;

- Satisfactory completion of an oral evaluation;
- Satisfactory completion of an observed task or activity related to a competency; or
- Documented evaluation of equivalencies.

Equivalencies should be used sparingly and with the utmost rigor and scrutiny to maintain the spirit and intent of the TQP. Equivalencies may be granted for individual competencies based upon objective evidence of previous education, training, certification, or experience. Objective evidence includes a combination of transcripts, certifications, and, in some cases, a knowledge sampling through a written and/or oral examination. Equivalencies shall be granted in accordance with the ORO TQP Manual. The supporting knowledge and/or skill statements, while not requirements, should be considered before granting equivalency for a competency.

Continuing Education, Training, and Proficiency

ORO personnel shall participate in continuing education and training as necessary to improve their performance and proficiency and ensure that they stay up-to-date on changing technology and new requirements. This may include courses and/or training provided by:

- DOE and ORO
- Other government agencies
- Outside vendors
- Educational institutions

Beyond formal classroom or technology-based courses, continuing training may include

- Self Study
- Attendance at symposia, seminars, exhibitions
- Special assignments
- On-the-job experience

A description of suggested learning proficiency activities and the requirements for the continuing education and training program for safety system oversight personnel are included in Appendix A of this Standard.

Duties and Responsibilities

Reflecting DOE M 426.1-1A, *Federal Technical Capability Manual*, Chapter III, "Technical Qualification Program," Section 1, Safety System Oversight, the following are the typical duties and responsibilities expected of SSO personnel:

1. Maintain communication and cognizant oversight of assigned safety systems, and monitor the performance and effectiveness of implementation of the contractor's system engineer program.
2. Attend contractor meetings with DOE Facility Representatives and contractor personnel responsible for system performance (e.g., cognizant system engineers and design authorities).

3. Review system health/status reports, design assessment reports, and research and development efforts and test results.
4. Interface with external organizations that provide insights on performance.
5. Perform other oversight activities on a routine basis.
6. Coordinate with Facility Representatives to ensure the operability of specific safety systems and to report the system status to line management. SSO personnel focus on the details of safety system operability implementation, while Facility Representatives focus on the integrated operational aspects of these systems and programs with respect to the overall operation of their assigned facilities.
7. Perform assessments, periodic evaluation of equipment configuration and material condition. The effect of aging on system equipment and components, the adequacy of application of work control and change control processes, and appropriateness of system maintenance and surveillance should be considered with respect to reliable performance of safety function(s) and/or impact on design, procurement, and installation.
8. Perform evaluations of the contractor's troubleshooting activities, investigations, root cause evaluations, and selection and implementation of corrective actions. These evaluations will also be performed at the request of line management. SSO personnel may be requested to respond to off normal events and investigations and should be able to provide relevant insights and serve as the DOE subject matter expert on issues related to their assigned systems.
9. Provide support to other Federal personnel, as appropriate. This will include supporting program/project managers and Facility Representatives responsible for implementing Integrated Safety Management in the operation, maintenance, and configuration management of facility safety systems.
10. Assess the contractor's compliance with relevant DOE regulations, applicable DOE directives, industry standards, contract requirements, safety basis requirements, and other system requirements.
11. Confirm that configuration documentation, procedures, and other sources of controlling information are current and accurate.
12. Report potential or emerging hazards immediately to DOE line management and Facility Representatives. Stop tasks, if required, to prevent imminent impact to the health and safety of workers and the public, to protect the environment, or to protect the facility and equipment and immediately notify the on-duty or on-call Facility Representative and DOE line management.
13. Serve as a subject matter expert in the development or revision of Functional Area Qualification Standards, mentor assigned backups, and qualify other candidates to the same Functional Area Qualifications and site-specific Qualification Standards attained to achieve SSO qualification.
14. Maintain cognizance of the planned and approved work scope to maintain and improve assigned safety systems.

Required Technical Competencies

The competencies contained in this office/facility-specific Standard are distinct from those competencies contained in the General Technical Base Qualification Standard and the DOE Functional Area Qualification Standards. Competencies from those standards are not repeated herein unless the level of knowledge is being raised, e.g. from familiarity level to working level. Each of the competency statements defines the level of expected knowledge and or skill that an individual must possess to meet the intent of this Standard. The supporting knowledge and/or skill statements further describe the intent of the competency statements. ORO line management will assign the specific safety systems to the SSO personnel. Qualification materials that may supplement this Standard should correspond to the SSO personnel's assigned facilities and safety systems.

Note: When regulations, Department of Energy directives, or other industry standards are referenced in this Qualification Standard, the most recent revision should be used.

1. Safety System Oversight personnel shall have a familiarity level knowledge of the basic operations and processes for DOE-Oak Ridge defense nuclear facilities.

Supporting Knowledge and/or Skills

a. Discuss the primary mission(s) of ORO defense nuclear facilities.
b. Describe some of the key operations processes performed at ORO defense nuclear facilities.
c. Discuss the major nuclear safety risks to workers and the public resulting from the operations at ORO defense nuclear facilities.
d. Identify the major non-nuclear hazards associated with ORO defense nuclear facility operations.
e. Discuss the primary nuclear facility protection features at ORO defense nuclear facilities for preventing or mitigating operational accidents.

2. Safety System Oversight personnel shall have a familiarity level knowledge of the conduct of operations and processes for DOE-Oak Ridge defense nuclear facilities.

Supporting Knowledge and/or Skills

a. Describe the contractor's operations organizational relationships, command and control line of authority, minimum shift requirements, and responsibilities in key site programs (work control, maintenance, configuration changes, equipment status, alarm response, etc.).
b. Identify the major status and tracking systems (logs, release sheets, status boards, etc.) used by shift managers from which system performance, status, and configuration information can be obtained.
c. Explain how the contractor maintains the configuration of safety systems (both physical and document configuration) throughout the work control, design change, and facility modification and fabrication processes.
d. Describe the contractual requirements for configuration management and what reliance (or credit) has been placed on this program by the contractor in the safety basis.

3. Safety System Oversight personnel shall have a familiarity level knowledge of the contractor's quality assurance (QA) program as applied to the assigned safety system(s).

Supporting Knowledge and/or Skills

a. Review the contractor's quality assurance program (QAP) and meet the principals responsible for its maintenance.
b. Describe how the QAP applies to the assigned safety systems.
c. Describe the various quality levels and their correlation to equipment Safety Classes.
d. Distinguish between QA hold, verification, and witness points and describe the authorities and responsibilities for use of these in the work control and procurement processes.
e. Describe the commercial grade dedication process, its purpose, and how it is applied to procurement of safety significant equipment and parts.
f. Describe the contractor's suspect/counterfeit parts prevention program relates to the assigned safety systems.

4. Safety System Oversight personnel shall have a working level knowledge of the general content of the safety basis requirements, as described in 10 CFR 830, Subpart B, and the related DOE orders, standards, and guides for the assigned safety system(s).

Supporting Knowledge and/or Skills

a. Identify and describe the Authorization Basis (AB) documents and describe the function and purpose of the assigned safety system(s) and major components and how these functions support the full spectrum of system operations.
b. Given the major design basis supporting analyses, System Design Descriptions, calculations, and other information sources, explain how system performance requirements satisfy the AB.
c. Perform a walk down of the assigned safety system(s) and/or contractor facilities to verify the related content of the documented safety analyses and other AB documentation.

5. Safety System Oversight personnel shall have a working level knowledge of the design basis for the assigned safety system(s).

Supporting Knowledge and/or Skills

a. Identify the principal documents (e.g., drawings, calculations, applicable portions of documented hazard and accident analyses, and vendor manuals) that define the design basis for the assigned safety system important to facility safety, identifying additional documents needed, and ensuring system documentation is kept up to date using a formal work control/change control process.
b. Explain how system performance requirements satisfy the AB.
c. Describe how the safety system design basis is considered for emergency planning.
d. Describe the requirements of DOE-STD-3024-98, *Content of System Design Descriptions,* and how they are implemented for the assigned safety system.

6. Safety System Oversight personnel shall have a working level knowledge of the operations and performance characteristics of the assigned safety system(s).

Supporting Knowledge and/or Skills

a. Identify the operating characteristics of the assigned safety system(s).
b. Meet and discuss the safety system oversight role with the contractor's cognizant system engineer.
c. Identify the major sources of contractor operating experience (e.g., lessons learned dissemination process, operator logs, system engineering notebooks) and how external (DOE or industry) experience is captured, tracked, and evaluated by the contractor; and applied to the design, maintenance, or operation of assigned safety systems.
d. Describe how the safety system is trended and review the operating history of the system.
e. Determine the system's operability criteria and any associated technical safety requirements.
f. Observe the operation of the safety system, if normally operated; or if not, during system testing and surveillance.

7. Safety System Oversight personnel shall have a working level knowledge of the maintenance requirements of the assigned safety system(s).

Supporting Knowledge and/or Skills

a. Describe the maintenance requirements of the safety system, and how to determine the status and adequacy of contractor maintenance activities.
b. Describe the different types of maintenance (e.g., predictive, preventative, and corrective) and techniques (e.g., reliability-centered maintenance) used to define maintenance requirements, and the contractor's process and responsibilities for deferring and deleting preventive maintenance requirements.
c. Explain how the contractor maintains the configuration of the safety system (both physical and document configuration) throughout the work control and design change processes.
d. Observe the safety system in the field and evaluate the conduct of maintenance work utilizing a work package from start to finish.
e. Describe the key considerations in preparing and implementing a troubleshooting plan to determine the root cause for equipment failures (e.g., evidence preservation, need for contingencies, application of Integrated Safety Management to trouble shooting, etc.).
f. Describe how the contractor obtains related facility or industry experience to support the root cause determination.

8. Safety System Oversight personnel shall have a working level knowledge of the contractor's system engineering program for the assigned system(s).

Supporting Knowledge and/or Skills

a. Describe the contractor's System Engineering Program and the principal staff who implement the program.
b. Describe the System Engineering Program's role in maintaining and improving safety system performance.
c. Identify the key criteria for determining that this role is adequately performed.
d. Assess the System Engineering Program to confirm it is fulfilling its assigned responsibilities.

9. Safety System Oversight personnel shall have a working level knowledge of problem identification, solving, and decision making techniques.

Supporting Knowledge and/or Skills

a. Describe and explain the application of problem analysis techniques including the following:
   - Root Cause Analysis
   - Causal Factor Analysis
   - Change Analysis
   - Barrier Analysis
b. Describe the common troubleshooting techniques.
c. Describe the key considerations in preparing and implementing a troubleshooting plan to determine the root cause for equipment failures (e.g., evidence preservation, need for contingencies, application of Integrated Safety Management to trouble shooting, etc.).
d. Describe how to obtain related facility or industry experience to support the cause determination.
e. Describe the contractor's corrective action program and its contributing processes.
f. Trace a safety system-related event through its causal analysis, corrective action, closure implementation and documentation, and verification processes.

10. Safety System Oversight personnel shall have a working level knowledge of assessment and evaluation tools and techniques.

Supporting Knowledge and/or Skills

a. Describe the assessment requirements and limitations associated with the interface with contractor employees.
b. Explain the essential elements and processes associated with the following assessment activities including:

   - Investigation
   - Fact Finding
   - Reporting

- Tracking to Closure
- Follow up
- Corrective Action Implementation

c. Describe the actions to be taken if the contractor challenges the assessment findings and explain how such challenges can be avoided.
d. Lead a team to conduct a performance based assessment (through walk downs, interviews, document reviews, and field observations) to confirm that:
   (1) AB documents are accurate and adequately maintained; system operation, maintenance, and performance is in accordance with this basis;
   (2) The effect of aging on system equipment and components is addressed; and
   (3) The contractor has an adequate System Engineer Program (e.g., staffing, qualifications, responsibilities, programs, etc.) for monitoring, maintaining, and improving system performance.

Appendix A

Continuing Education, Training and Proficiency Program

The following activities describe suggested continuing education, training, and other opportunities that are available for ORO personnel after completion of the competency requirements in this Qualification Standard. It is extremely important that personnel involved with this program maintain their proficiency through continuing education, training, reading, or other activities such as workshops, seminars, and conferences. Specific continuing training requirements shall be documented in Individual Development Plans.

1. Continuing technical education and/or training covering topics directly related to the safety system oversight as determined appropriate by management. This may include courses/training provided by Department of Energy, other government agencies, outside vendors, or local educational institutions. Continuing training topics should also address identified weaknesses in the knowledge or skills of the individual personnel.

2. Active performance of safety system oversight duties at a DOE ORO facility.

3. Attendance at seminars, symposia, or technical meetings related to safety system oversight.

4. Self-study of new regulations, requirements, or advances related to safety system oversight.

5. Participation in practical exercises such as emergency or operational drills, simulations, or table-top exercises.