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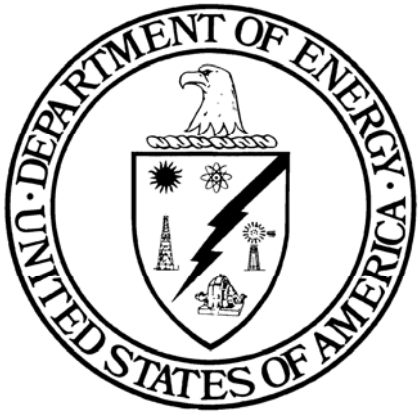
DOE STANDARD

OCCUPATIONAL SAFETY FUNCTIONAL AREA QUALIFICATION STANDARD

DOE Defense Nuclear Facilities Technical Personnel



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APPROVAL

The Federal Technical Capability Panel consists of senior U.S. Department of Energy (DOE) managers responsible for overseeing the Federal Technical Capability Program. This panel is responsible for reviewing and approving the qualification standard for Department-wide application. Approval of this qualification standard by the Federal Technical Capability Panel is indicated by signature below.

Karen Boardman, Chairperson
Federal Technical Capability Panel

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ACKNOWLEDGMENT

The National Nuclear Security Administration, Office of Technical Services is the sponsor for this Occupational Safety Functional Area Qualification Standard (FAQS). The sponsor is responsible for coordinating the revision and review of this FAQS by subject matter experts to ensure the technical content of the standard is accurate and adequate for Department-wide application for those involved in occupational safety at nuclear facilities. Predominately, the competencies are equally applicable at non-nuclear facilities. The sponsor, in coordination with the Federal Technical Capability Panel, is also responsible for ensuring the FAQS is maintained current.

The following subject matter experts participated in the development and/or review of this qualification standard:

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U.S. DEPARTMENT OF ENERGY
FUNCTIONAL AREA QUALIFICATION STANDARD

OCCUPATIONAL SAFETY

PURPOSE

DOE O 426.1, *Federal Technical Capability Order*, commits the Department to continuously strive for technical excellence. The Technical Qualification Program (TQP), along with the supporting technical qualification standards, complements the personnel processes that support the Department's drive for technical excellence. In support of this goal, the competency requirements defined in the technical qualification standards should be aligned with and integrated into the recruitment and staffing processes for technical positions. The technical qualification standards should form the primary basis for developing vacancy announcements, qualification requirements, crediting plans, interview questions, and other criteria associated with the recruitment, selection, and internal placement of technical personnel. The U.S. Office of Personnel Management (OPM) minimum qualifications standards will be greatly enhanced by application of appropriate materials from the technical Functional Area Qualification Standard (FAQS).

The technical qualification standards are not intended to replace the OPM qualifications standards or other Departmental personnel standards, rules, plans, or processes. The primary purpose of the TQP is to ensure that employees have the requisite technical competency to support the mission of the Department. The TQP forms the basis for the development and assignment of DOE personnel responsible for ensuring the safe operation of defense nuclear facilities.

APPLICABILITY

The Occupational Safety technical functional area qualification standard (FAQS) establishes common functional area competency requirements for all DOE occupational safety personnel who provide assistance, or direction, guidance, oversight, or evaluation of contractor technical activities that could impact the safe operation of DOE's defense nuclear facilities. The FAQS is a tool to assist DOE program and field offices in the development and implementation of the TQP in their organization. For ease of transportability of qualifications between DOE elements, program and field offices are expected to use this technical FAQS without modification. Needed additional office-/site-/facility-specific technical competencies should be handled separately. Satisfactory and documented attainment of the competency requirements contained in this technical FAQS (see the Federal Technical Capability Program [FTCP] Directives and Standards page at http://www.hss.energy.gov/deprep/ftcp/directives/directives.asp for an example of the Occupational Safety FAQS qualification card) ensures that personnel possess the minimum requisite competence to fulfill their functional area duties and responsibilities common to the DOE complex. Additionally, office-/site-/facility-specific qualification standards supplement this technical FAQS and establish unique operational competency requirements at the Headquarters, field element, site, or facility level.

It should be noted that the competencies of management and leadership, general technical knowledge, regulations, administrative capability, and assessment and oversight are all

embodied in the competencies listed in this standard. All of these factors have a bearing on safety. Although the focus of this standard is technical competence, competencies such as good communication, recognized credibility, ability to listen and process information, and the

ability to guide an effort to get it right the first time are recognized as important aspects of safety.

Occupational safety includes many safety topics and functions supporting implementation of 10 CFR 851, OSHA, and other Federal safety programs. While OSH managers may not be expert in all technical aspects of safety, managers should ensure that individual OSH manager technical qualification requirements are developed to reflect the position-specific need for expert safety qualifications. One should also be skilled at recognizing when to consult with or defer to the highly specialized skills of those professionally practicing other safety functions.

Occupational safety and health is a cross-disciplinary area concerned with protecting the safety, health and welfare of people engaged in work or employment. The goal of all occupational safety and health programs is to foster a safe work environment. As a secondary benefit, it may also protect co-workers, family members, employers, customers, suppliers, nearby communities, and other members of the public who are impacted by the workplace environment. It may involve interactions among many subject areas, including occupational medicine, occupational (or industrial) hygiene, public health, safety engineering, construction, chemistry, health physics, ergonomics, toxicology, epidemiology, environmental health, industrial relations, public policy, sociology, and occupational health psychology.

IMPLEMENTATION

This FAQS identifies the minimum technical competency requirements for DOE personnel. Although there are other competency requirements associated with the positions held by DOE personnel, this FAQS is limited to identifying the specific, common technical competencies required throughout all defense nuclear facilities. The competency requirements define the expected knowledge and/or skill that an individual must meet. Each of the competency requirements is further described by a listing of supporting knowledge and/or skill statements. The supporting knowledge and/or skill statements for each competency requirement are provided to challenge the employee in the breadth and depth of his/her understanding of the subject matter. In selected competencies, expected knowledge and/or skills have been designated as “mandatory performance activities.” In these competencies, the actions are not optional.

The term “must” denotes a mandatory requirement, “should” denotes a recommended practice that is not required, and “may” denotes an option in this standard.

The competencies identify a familiarity level, a working level, or an expert level of knowledge; or they require the individual to demonstrate the ability to perform a task or activity. These levels are defined as follows:

> **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 recognize the

need to seek and obtain appropriate expert advice (e.g., technical, legal, safety) or consult appropriate reference materials required to ensure the safety of DOE 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 DOE practices.

Headquarters and field elements must establish a program and process to ensure that DOE personnel possess the competencies required by their position, including the competencies identified in this technical FAQS. Documentation of the completion of the requirements of this standard must be included in the employees' training and qualification records. Satisfactory attainment of the competency requirements contained in this technical FAQS may be documented using the example Occupational Safety FAQS qualification card that can be obtained from the Federal Technical Capability Program Directives and Standards page at http://www.hss.energy.gov/deprep/ftcp/directives/directives.asp.

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 on objective evidence of previous education, training, certification, or experience. Objective evidence includes a combination of transcripts, certifications, and in some cases, a knowledge sampling obtained through written and/or oral examinations. Equivalencies must be granted in accordance with the TQP plan of the site/office/Headquarters organization qualifying the individual. The supporting knowledge and/or skill statements and mandatory performance activities should be considered before granting an equivalency for a competency.

Training must be provided to employees in the TQP who do not meet the competencies contained in this technical FAQS. Training may include, but is not limited to, formal classroom and computer-based courses, self-study, mentoring, on-the-job training, and special assignments. Departmental training must be based on appropriate supporting knowledge and/or skill statements similar to the ones listed for each of the competency requirements. Headquarters and field elements 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 technical FAQS competency requirements.

EVALUATION REQUIREMENTS

Attainment of the competencies listed in this technical FAQS must be documented in accordance with the TQP plan or policy of the site/office/Headquarters organization qualifying the individual and the requirements in DOE M 360.1-1B, *Federal Employee Training Manual*, and DOE O 426.1.

The qualifying official or immediate supervisor should ensure that the candidate meets the background and experience requirements of this FAQS. Unless stated otherwise within the program or site TQP plan, attainment of the competencies listed in the Occupational Safety FAQS should be evaluated and documented by either a qualifying official or immediate supervisor (note: if the immediate supervisor is not an occupational safety specialist, it is

expected that the supervisor consult with a qualified occupational safety specialist) using one or a combination of the following methods:

- Satisfactory completion of a written examination
- Satisfactory completion of an oral examination
- Satisfactory accomplishment of an observed task or activity directly related to a competency
- Documented evaluation of equivalencies (such as applicable experience in the field) without a written examination

Field element managers/Headquarters program managers must qualify candidates as possessing the basic technical knowledge, technical discipline competency, and position-specific knowledge, skills, and abilities required for their positions. Final qualification should be performed using one or a combination of the following methods:

- Satisfactory completion of a comprehensive written examination. The minimum passing grade should be 80 percent.
- Satisfactory completion of an oral examination by a qualified Senior Technical Safety Manager (STSM) or a qualification board of technically qualified personnel that includes at least one qualified STSM.
- Satisfactory completion of a walkthrough of a facility with a qualifying official for the purpose of verifying a candidate's knowledge and practical skills of selected key elements.

Guidance for oral interviews and written exams is contained in DOE-HDBK-1205-97, *Guide to Good Practices for the Design, Development, and Implementation of Examinations*, and DOE-HDBK-1080-97, *Guide to Good Practices for Oral Examinations*.

For oral examinations and walkthroughs, qualifying officials or board members should ask critical questions intended to integrate identified learning objectives during qualification. Field element managers/Headquarters program managers or designees should develop formal guidance for oral examinations and walkthroughs that includes:

- Standards for qualification
- Use of technical advisors by a board
- Questioning procedures or protocol
- Pass/fail criteria
- Board deliberations and voting authorization procedures
- Documentation process

INITIAL QUALIFICATION AND TRAINING

Qualification of occupational safety personnel must be conducted in accordance with the requirements of DOE O 426.1.

DOE personnel must 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
- Other government agencies
- Outside vendors
- Educational institutions

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

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

A description of suggested learning activities and the requirements for the continuing education and training program for the Occupational Safety FAQS are included in Appendix A of this document.

DUTIES AND RESPONSIBILITIES

The following are the typical duties and responsibilities expected of personnel assigned to the Occupational Safety functional area:

1. Serve as a knowledgeable individual in occupational and industrial safety for DOE and contractors concerning safety issues and programs.
2. Review occupational safety analyses, assessments and corrective actions, and other occupational safety documentation for compliance with applicable requirements.
3. Evaluate the adequacy and compliance of, facilities and equipment to prevent failure or injury using established standards, and make recommendations to achieve compliance and improve safety.
4. Review proposed and existing program documents for scope, content, and adequacy; and recommend improvements in occupational and industrial safety practices and procedures.
5. Apply in-depth knowledge of physical phenomena, engineering, and scientific concepts to analyze and solve safety problems that could result in substantial modification of existing standards and practices, methods, and techniques.
6. Provide oversight of contractor safety through the conduct of occupational safety evaluations, inspections, and assessments of safety programs, operations, and facilities to ensure compliance with local, state, and Federal rules, regulations, and standards.
7. Conduct or assist in conducting investigations of process and facility deficiencies, equipment failures, accidents, injuries, or fatalities to determine causal factors and recommend corrective actions.
8. Represent DOE in meetings, conferences and committees involving technical issues, policy, and other matters pertinent to occupational safety, and coordinate occupational safety programs with other Federal agencies.
9. Identify that the contractor safety program is using an appropriate hazard analysis technique for each situation, and that resulting hazard control measures and required abatement activities are adequate and implemented.
10. Serve as chairperson, member, or technical advisor of accident/incident boards at the assigned facility or other DOE installations.
11. Determine the need for, organize, and chair working groups involving DOE, contractors, and other agency personnel to facilitate information exchange and to solve difficult and complex issues or problems to promote continuous safety improvement.
12. Oversee and support DOE and contractor actions for obtaining a variance from occupational safety standards and requirements.
13. Participate in special assignments and perform assessments related to occupational safety.

Position-specific duties and responsibilities for occupational safety personnel are contained in site-specific qualification standard and/or position description.

BACKGROUND AND EXPERIENCE

The OPM *Qualification Standards Operating Manual* establishes minimum education, training, experience, or other relevant requirements applicable to a particular occupational series/grade level, as well as alternatives to meeting specified requirements.

The preferred education and experience for occupational safety personnel is as follows:

Education

Engineering or Bachelor of Science degree in a related professional field (for example, architecture, physics, mathematics, or chemistry) is the minimum educational requirement. Candidates are preferred if they have taken courses in safety-related fields (for example, industrial safety, occupational safety, industrial hygiene, mine safety) from an accredited institution.

Major study should be in safety or occupational health fields (safety, occupational health, industrial hygiene), or degree in other related fields that included or was supplemented by at least 24 semester hours of study from among the following (or closely related) disciplines:

- Safety
- Engineering
- Occupational health
- Industrial hygiene
- Occupational medicine
- Toxicology
- Mathematics
- Physics
- Chemistry
- Biological sciences
- Public health
- Industrial psychology.

Alternative requirements specified in the *Qualification Standards for General Schedule Positions Operating Manual* for GS-018, Safety and Occupational Health Management are also acceptable.

Experience

Experience is a critical aspect of ensuring competency and proficiency in the various functional technical areas. Experience may include industrial, military, Federal, state-related occupations, professional registrations, or may be gained from other occupations that specialize in occupational safety programs. Specialized experience may be demonstrated through possession of the competency requirements outlined in this standard. Safety and Health technical professionals are encouraged to seek certification in their subject discipline, but it is not mandatory.

REQUIRED TECHNICAL COMPETENCIES

The competencies contained in this standard are distinct from those competencies contained in the General Technical Base (GTB) Qualification Standard. All occupational safety personnel must satisfy the competency requirements of the GTB Qualification Standard prior to or in parallel with the competency requirements contained in this standard. Each of the competency requirements defines the level of expected knowledge and/or skill that an individual must possess to meet the intent of this standard. Each of the competency requirements is further described by a listing of supporting knowledge and/or skill statements that describe the intent of the competency statements. In selected competencies, expected knowledge and/or skills have been designated as "mandatory performance activities." In these competencies, the actions are not optional.

Note: When regulations, DOE directives, or other industry standards are referenced in the FAQS, the most recent revision should be used. It is recognized that some occupational safety personnel may oversee facilities that use predecessor documents to those identified. In those cases, such documents should be included in local qualification standards via the TQP.

1. **Occupational safety personnel must demonstrate a working level knowledge of philosophy, scope, application, and content of the following DOE and DOE-acknowledged programs directly influencing occupational safety:**

   - DOE Policy 450.4A, *Integrated Safety Management Policy*
   - Human performance improvement (HPI)
   - High reliability organizations (see DOE-HDBK-1028-2009, Volume 1, *Concepts and Principles)*

   Supporting Knowledge and Skills

   a. Discuss relationships of integrated safety management (ISM) to Federal regulatory requirements for safety.

   b. Explain how ISM is translated from a contract requirement to contractor programs and procedures using a functional safety program as a model for discussion.

   c. Describe and demonstrate understanding of the ISM approach from policy through implementation guides. Discuss objectives, core functions, and guiding principles approach to systematically integrate safety into management and work practices at all levels.

   d. Outline the actions specified in the ISM policy and program that are needed to fully implement ISM, including ISM system description, periodic self assessments, and leadership and management actions needed to implement a quality ISM program.

   e. Discuss how human performance improvement meshes with ISM and how it can be applied within contractor safety programs.

   f. Explain the major tenets of HPI and describe how controlling personnel, environment, and management conditions reduces worker and operational risks.

g. Discuss the concepts of HPI and human factors engineering and explain how these integrate with ISM and work control to manage risk.

h. Discuss the relationships between high reliability organizations concepts and ISM principles to include discussion about organizational structure, leadership, corporate programs, and training and qualifications.

Mandatory Performance Activities:

i. Participate in a DOE or contractor sponsored assessment of ISM, HPI or similar corporate level safety management program under the guidance or mentoring of a Qualifying Official or other competent safety person .

2. Safety personnel must demonstrate a working level knowledge of DOE risk philosophy and how DOE manages risk.

Supporting Knowledge and Skills

a. Describe the purpose of DOE M 411.1-1C, *Safety Management Functions, Responsibilities and Authorities Manual (FRAM)* and how it relates to risk management and risk oversight.

b. Explain fundamental concepts of risk, risk management and risk analysis.

c. Discuss the relationships of risk management to ISM, OSHA, and Nuclear Safety, including the relationships with DOE contractors.

d. Explain how the DOE directives system and publications, including technical standards supports risk management and informed decision-making.

e. Discuss risk, DOE risk acceptance, who has responsibility for risk acceptance, and how are contractors informed of duties to control risk.

f. Discuss appropriate or required measures for obtaining interpretations of, or variances/exemptions from, occupational safety requirements in 10 CFR 851, 10 CFR 830 and DOE orders, and explaining how these affect risk posture.

g. Understand Worker's Compensation.

h. Describe DOE requirements for and values of a applying hazard analysis techniques during the design phase of a facility, operation, process, or piece of equipment.

3. Occupational safety personnel must demonstrate a working level knowledge of quality assurance program structure and content and of how quality programs and oversight support safety and health.

Supporting knowledge and skills

a. Explain and gain evaluator experience in applying ISM and the concepts of DOE O 414.1D, *Quality Assurance,* during evaluation of work programs, practices and safety incidents.

b. Identify key aspects of a quality program and explain why these are important to safety.

c. Explain the major differences between the quality assurance requirements in 10 CFR 830 and DOE O 414.1D.

d. Explain the need for the interface requirements between quality assurance and other management systems, such as ISM, procurement, oversight, lessons learned, and construction management.

e. Define the terms: quality, quality assurance, quality assurance program, item, service, quality control, and process.

f. Demonstrate the ability to apply quality principles and criteria in DOE O 414.1D and 10 CFR 830, Subpart A.

g. Explain how DOE P 226.1B, *Department of Energy Oversight Policy a*nd DOE O 226.1B, *Implementation of Department of Energy Oversight Policy i*ncorporate quality principles.

Mandatory Performance Activities:

h. Demonstrate training on DOE O 414.1D or attend NQA-1 Lead Auditor or equivalent training.

i. Explain and gain evaluator experience in applying ISM and the concepts of DOE O 414.1D, *Quality Assurance,* during evaluation of work programs, practices and safety incidents.

4. Occupational safety personnel must demonstrate a familiarity level knowledge of the organizational structure, mission and primary documents of Federal, state, local and consensus organizations contributing to occupational safety.

Supporting Knowledge and Skills

a. Discuss compatibility between, and describe the respective applicability of occupational safety requirements contained in DOE Orders and applicable local, state, or Federal regulations, and of related consensus standards.

b. Explain the roles, purpose and applicability to DOE safety of the OSHA, NFPA, IEEE, NIOSH, CDC, INPO, ASTM, ASME, NRC, and similar organizations.

c. Identify safety credentialing organizations and their scope, including those for safety professionals, industrial hygienists, professional engineers, health physicists, and those related to the TQP participant specific duty assignments.

d. Identify the DOE-sponsored or DOE-affiliated safety committees that provide technical expertise or professional opinions to DOE, including explosives, construction hoisting and rigging, beryllium, nanotechnology, and EFCOG working groups.

e. Describe the difference between Requests for Information, Advanced Notice of Proposed Rulemaking, Notice of Proposed Rulemaking, and a Final Rule as it relates to regulatory entries in the Federal Register.

f. Discuss the purpose and applicability of DOE technical standards and where these can be located within the DOE directives program.

5. **Occupational safety personnel must demonstrate a working level knowledge of the occupational safety purpose, scope, program structure and requirements of 10 CFR 851, DOE O 440.1B, DOE technical standards, and other Occupational Safety and Health Administration regulations.**

   Supporting Knowledge and Skills

   a. Discuss relationships between DOE Orders and OSHA standards and have a working knowledge of the applicability of OSHA requirements to DOE and contractors, including subcontractors. Consider purpose, scope and applicability of:

      - 29 CFR 1910, “Occupational Safety and Health Regulations”
      - 29 CFR 1926, “Safety and Health Regulations for Construction”
      - 10 CFR 851, “Worker Safety and Health Program”

   b. Discuss the OSHA General Duty Clause of Public Law 91-596, Section 5 (a)(1) and its applicability.

   c. Discuss contract mechanisms and implementation processes that flow safety and health requirements from DOE to major contractors and their sub-tier contractors.

   d. Describe requirements and methods for achieving Federal employee safety under 29 CFR 1960, “Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters,” and DOE Order 440.1B, *Worker Protection Program for DOE (including the National Nuclear Security Administration) Federal Employees.*

6. **Occupational safety personnel must demonstrate a working level knowledge of hazard recognition theory and concepts of worker protection and control selection.**

   Supporting Knowledge and Skills

   a. Define hazard, consequences, risk, control, hazard analysis, incident likelihood, control

   b. Define the elements and application of a hazard abatement program.

   c. Explain the concepts and application of integrated work planning and work control programs using the ISM model to include using integrated teams of knowledgeable individuals covering the range of safety functional areas (e.g., industrial hygiene, radcon, construction safety).

   d. Discuss the need for hazard recognition and integrated control of hazards among collocated operational activities covering multiple competing safety functional areas .

   e. List typical DOE hazards and identify a work condition where each hazard is likely to be found.

   f. Discuss application and effectiveness (pros and cons) of using computer-based hazard identification and control tools or other automated logic processes.

Mandatory Performance Activities:

g. Perform walkdown of an operation or facility, D&D project, waste management or construction project to identify that hazards are captured in the operations work planning and control documents.

7. Occupational safety personnel must demonstrate a working level knowledge of hazard analysis techniques and of application of hazard control methods and mitigation activities.

Supporting Knowledge and Skills

a. Explain hazard analysis techniques, and derivation of controls to reduce worker and operational risk. Describe the hierarchy of hazard control methods

b. Identify common types of engineering and administrative controls and discuss the applicability and relationships of each.

c. Discuss importance of informing affected workers of hazards, mitigation and abatement activities, and application of controls.

d. Identify general personal protective equipment (PPE) requirements, functionality and effects of PPE on safety and worker performance for industrial operations.

e. Demonstrate appropriate selection and performance of qualitative and quantitative risk analysis techniques.

- What-if analysis
- Preliminary hazard analysis
- Fault tree analysis
- Failure modes and effects analysis
- Energy trace and barrier analysis
- Hazard and operability analysis (HAZOP)
- Process hazard analysis
- Root cause analysis

8. Occupational safety personnel must demonstrate the ability to perform occupational safety trend analyses.

Supporting Knowledge and Skills

a. Discuss key processes used in operation trending, analysis, post-operation activity information, and their relationships to occupational safety activities.

b. Explain the purpose and methods described in 29 CFR 1904, “Recording and Reporting Occupational Injuries and Illnesses” and demonstrate a working ability to compute total recordable cases (TRC) and days away, restricted time (DART) rates.

c. Determine what type and scope of analysis should be performed and how performance indicators describe the quality of the programs being assessed.

d. Analyze incident/occurrence report data for a specified period for safety trends or compliance problems and communicate results to workers and management.

e. Describe OSHA's injury and illness record keeping and the DOE computerized accident/incident reporting system (CAIRS) and subsequent uses in safety trending.

f. Discuss current DOE efforts to improve and implement leading and lagging indicators, including safety functional areas, organizations collecting performance incentive indicator data, DOE rollup of data and management actions to improve use of indicators.

Mandatory Performance Activities:

g. Evaluate a DOE contractor’s safety performance metrics and explain how these represent the effectiveness of the respective safety programs or target specific safety risks.

9. Occupational safety personnel must demonstrate a working level knowledge of safety considerations associated with industrial operations.

Supporting Knowledge and Skills

a. Describe common industrial operations (e.g., maintenance, production, testing, inspection, and setup [both facility and equipment]) and related activities (e.g., welding, material handling, machining, cleaning, and coating), including the hazards and safety interfaces necessary to protect workers and safely perform work.

b. Describe safety considerations associated with placement of operations and equipment (i.e., location of personnel in the proximity of moving equipment or parts, traffic patterns, and structural support for equipment).

c. Outline point of operation hazards associated with workplace equipment and describe appropriate machine guarding principles.

d. Describe common concerns and associated control measures that must be addressed in the workplace environment (e.g., noise, thermal burn hazards, heat stress, vibration, eye hazards, workplace illumination, and lasers).

e. Address the following confined space hazard considerations for industrial operations:

- Describe the characteristics of a confined space hazard
- Identify potential construction related confined space locations
- Identify and discuss the application of confined space entry procedures.

f. Describe the Hazardous Waste Operations and Emergency Response Regulations (HAZWOPER) activities at a waste site.

g. Discuss elements of hazard communications for industrial operations involving hazard specific programs (e.g., vehicle safety, violence in the workplace, asbestos, silica, lead, beryllium, blood borne pathogens, and infectious diseases).

Mandatory Performance Activities:

h. Perform an occupational safety assessment of operations facility under the mentorship of a person qualified per the standard.

10. Occupational safety personnel must demonstrate a working level knowledge of electricity and electrical hazards and controls to understand an electrical safety program and to coordinate it with an occupational safety program.

Supporting Knowledge and Skills

a. Demonstrate determination of appropriate protective equipment and operational controls.

b. Perform a walkdown of a DOE facility with an electrical safety officer to identify hazards and discuss controls and electrical installations. Explain how the DOE implements and oversees contractor electrical safety programs, discussing the DOE directives and national standards.

c. Define specific terminology applicable to the following:

- Measurement of electricity
- Power systems
- Electrical distribution systems
- Protective devices
- Control measures
- Electrical severity indices

d. Describe industrial electrical risk, hazards, and controls (e.g., arc flash, human response to electricity, temporary wiring, grounding, and exposed electrical wires, equipment, or parts).

e. Describe major safety concerns and appropriate control measures for working on or near live electrical equipment (e.g., proper use of lockout/tagout procedures, NFPA 70E, 29 CFR 1910.147, 10 CFR 851, DOE Electrical Safety Handbook).

f. Describe the use, function, and appropriate application of PPE designed to protect workers from identified electrical hazards.

g. Identify necessary training required for employees exposed to electrical hazards.

h. Identify and discuss application and function of major safety requirements and protective devices associated with electrical equipment and wiring in hazardous locations.

i. Discuss selection, use, and performance of electrical tools and equipment noting their uses and limitations.

Mandatory Performance Activities:

j. Attend professional training in NFPA 70E and then participate in an assessment of a DOE contractor's implementation of these requirements.

11. Occupational safety personnel must demonstrate a working level knowledge of safety in construction operations, including regulatory requirements.

Supporting Knowledge and Skills

a. Discuss the role of safety and health during project planning and analysis.

b. Describe safety program considerations at multi-employer construction sites.

c. Demonstrate the ability to perform the following:

- Evaluate construction operations and identify construction hazards
- Identify, interpret, and apply appropriate construction safety requirements
- Identify and implement appropriate control measures

d. Identify excavation and trenching hazards and control considerations, including the following:

- Factors affecting soil stability in a trench
- Application of different types of shoring, sloping, and shielding systems
- Excavation and trenching inspection considerations

e. Discuss the following hazard control considerations associated with demolition operations:

- Project planning and activity hazard analyses
- Structural support considerations
- Hazards associated with debris and appropriate removal techniques
- Hazards associated with remaining energy sources, equipment, and materials (hazardous chemical /wastes)
- Applicability of DOE-STD1120-2005, *Integration of Environment, Safety, and Health into Facility Disposition Activities*

f. Describe construction-related heat and cold stress hazards and identify appropriate control measures.

g. Discuss hazards and identify appropriate controls associated with construction equipment and operations, including but not limited to, the following:

- Scaffolding and other elevated work structures or platforms
- Tools, hand and power
- Heavy equipment (e.g., earth-moving equipment) and traffic
- Placement and temporary support of walls, floors, and other structures

h. Discuss DOE oversight activities common to construction projects and resolution of deficiencies (i.e., DOE G 440.1-2, *Construction Safety Management Guide for Use with DOE O 440.1B*).

Mandatory Performance Activities;

i. Identify hazards related to new construction (e.g., steel erection, masonry work, fall protection, wood framing, and shoring) at a construction site.

12. Occupational safety personnel must demonstrate a working level knowledge of accident/incident investigation, analysis, and reporting as it is practiced within DOE.

Supporting Knowledge and Skills

a. Describe purpose of and DOE directives for accident/incident investigations (e.g., DOE O 225.1B, *Accident Investigations*).

b. Discuss and demonstrate ability to apply criteria for determining the need for a particular type of accident/incident investigation.

c. Describe accident causation models, emphasizing the importance of human reliability and effective management systems.

d. Discuss and apply necessary techniques for gathering facts applicable to an investigation and interviewing witnesses.

e. Discuss and apply necessary analysis techniques used in accident investigations, such as management oversight and risk tree; change analysis; events and causal factor analysis; energy trace and barrier analysis; and basic logic tree analysis methods.

f. Describe purpose and content of an accident investigation report.

g. Discuss importance of providing feedback on accident investigations, and describe the management systems necessary to ensure this feedback is communicated to DOE.

h. Describe and understand the importance of securing the accident scene, preserving evidence, and rules of conduct, including contractor cooperation.

i. Discuss event and causal factor charting for an incident.

13. Personnel must demonstrate a familiarity level knowledge of the occurrence reporting and processing system necessary to ensure that occurrences are properly reported and processed in accordance with DOE M 231.1-2, *Occurrence Reporting and Processing of Operations Information.*

Supporting Knowledge and Skills

a. Define the term reportable occurrence, and using an actual facility-specific occurrence report, discuss the factors contributing to the occurrence.

b. List the conditions or events that require prompt and follow-up notification to DOE/NNSA.

c. Describe the importance of reporting between contractors and Federal workers and have a working knowledge of various reporting systems, requirements, and investigations.

d. Explain the relationship of ORPS to accident investigations identifying overlaps, contractor and Federal roles, and value for improving safety and health.

14. Occupational safety personnel must demonstrate a working level knowledge of the purpose, general content, development, and performance of worker occupational safety training.

Supporting Knowledge and Skills

a. Describe the requirements of DOE O 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*.

b. Describe purpose of DOE O 426.1, *Federal Technical Capability,* in fielding a competent occupational safety workforce. Include a description of the Technical Qualification Program

c. Identify safety training requirements addressed in applicable regulations or DOE Orders.

d. Discuss basics of training development techniques, emphasizing the importance of using behavioral objectives.

e. Discuss concepts of behavior modification and performance improvement.

f. Discuss considerations for the development of a training course. Describe the various types (and uses) of training material and techniques.

g. Discuss basics of evaluating a training course or program and the importance of, and methods for, evaluating occupational safety training effectiveness.

h. Describe the role and limitations of worker training in a comprehensive safety program.

i. Describe the role and value of a job safety analysis as a training tool.

j. Identify the key elements of HAZWOPER training as defined in 29 CFR 1910.120, Appendix E.

15. Occupational safety personnel must demonstrate a working level knowledge of motor vehicle safety.

Supporting Knowledge and Skills

a. Identify safe driving and defensive-driving techniques.

b. Discuss pre- and post-driving vehicle inspections.

c. Discuss how the application and use of control measures, equipment, road conditions, and barriers are effected by environmental conditions.

d. Discuss actions and procedures for reporting vehicle accident or property damage.

e. Discuss OSHA requirements for safe use of powered industrial trucks (see 29 CFR 1910.178, “Powered Industrial Trucks”*).*

f. Describe bicycle and pedestrian hazards and controls.

16. Occupational safety personnel must demonstrate a working level knowledge of the requirements and methods to maintain communication with DOE headquarters, field elements (including contractors), other Federal agencies, and regulatory agencies.

Supporting Knowledge and Skills

a. Describe the DOE's safety organization and discuss DOE's procedures for communicating between DOE headquarters and field elements.

b. Describe DOE's procedures and policies (including formal memorandums of understanding) for communicating with other Federal or regulatory agencies.

c. Define the respective jurisdictions of DOE and OSHA concerning occupational safety and health matters on DOE worksites.

d. Describe methods DOE uses to inform contractors of the need for improvements, including notices of violation, contract actions, formal and informal communications. Identify who or which organizations have authority to conduct these communications.

17. Occupational safety personnel must demonstrate a working level knowledge of the development and management of both the technical and programmatic elements of an occupational safety program.

Supporting Knowledge and Skills

a. Discuss the function and typical content of a safety program that meets 10 CFR 851 and OSHA and applies integrated safety management and compare these to DOE-OSHA voluntary protection program (VPP).

b. Discuss general principles of management applicable to the organization of the safety function, safety program planning, safety program evaluation, and communications with labor, management, and the public.

c. Describe the role and significance of the following major elements in a successful safety program:

- Positive management leadership
- Assignment of safety management roles, authorities, accountabilities, and responsibilities
- Formal statement of policy
- Maintenance of safe working conditions
- Establishment of control and prevention programs
- Worksite analysis
- Training
- Employee involvement
- Program and work area assessments

d. Describe importance of and methods for establishing, updating, and measuring program performance against safety program goals and objectives.

e. Identify common safety program performance indicators.

f. Discuss safety program funding and human resource issues that must be considered in both short and long-term plans and budgets.

g. Discuss importance of employee participation in the implementation of the safety programs and identify potential methods to ensure or encourage involvement.

Mandatory Performance Activities:

h. Participate in a management or employee activity implementing or improving workplace safety such as VPP assessment, local safety committee project, or safety implementation for new work startup.

18. Occupational safety personnel must demonstrate a working level knowledge of assessment techniques applicable to evaluating occupational safety, reporting

results, hazard mitigation and abatement, and following up on actions taken as the result of assessments.

Supporting Knowledge and Skills

a. Describe oversight roles and responsibilities of Federal and contractor occupational safety personnel for nuclear facilities.
b. Discuss the DOE policy and orders for contractor oversight.
c. Describe the role and performance of fact-finding interviews during an occurrence investigation.
d. Discuss research and analysis of directive and regulatory requirements that serve as the basis of assessment topics and evaluation criteria.
e. Explain essential elements of a performance-based assessment, including the lines of inquiry, fact-finding and reporting, including a follow-up closure of assessment.
f. Describe the typical content and format of an assessment report addressing occupational safety.
g. Identify the function of common DOE managed oversight such as Chief of Defense Nuclear Safety (CDNS) reviews and ORRs.

Mandatory Performance Activities:

h. Plan, coordinate, and conduct a safety-focused assessment, including writing an assessment report, and participating in welcome and closeout briefs.

19. Occupational safety personnel must demonstrate a working level knowledge of fire hazards and the principles and methods of fire prevention and protection.

Supporting Knowledge and Skills

a. Discuss fire chemistry (i.e., four required elements) and role of this chemistry in fire prevention and protection efforts.
b. Describe workplace and facility inspection procedures necessary to identify fire hazards and assess the status of compliance with applicable regulations.
c. Describe fire protection considerations that must be addressed in the review of proposed or existing processes and operations, and identify appropriate control measures.
d. Discuss need to develop, maintain, and implement work procedures that focus on the prevention of fires and explosions, such as hot-work permits, fire watches, and proper handling and storage of flammable materials.
e. Discuss and assess applicability of fire detection system requirements.
f. Discuss and assess applicability of portable and fixed-fire suppression equipment requirements.

g. Discuss and assess application of requirements related to basic design principles in the National Fire Protection Association 101, Life Safety Code, including emergency egress, evacuation, and other related program elements.

h. Discuss role and purpose of fire protection design considerations, including fireproof and fire-resistant structures, firewalls, and fire curtains.

i. Discuss health and safety hazards of currently employed fire suppressant systems.

j. Discuss cutting and welding safety, including activities in confined spaces.

k. Conduct a fire protection walkthrough with a qualified fire protection engineer or a fire protection FAQS qualified individual to identify and describe fire protection equipment and discuss hazards.

20. Occupational safety personnel must demonstrate a working level knowledge of fall protection, including programs, training requirements, hazards and elimination or control.

Supporting Knowledge and Skills

a. Discuss scope and content of the DOE and national regulations and standards associated with fall protection, including:

- 29 CFR 1926, Subpart M, “Fall Protection”
- 29 CFR 1910, Subpart F, “Powered Platforms, Manlifts and Vehicle Mounted Work Platforms”
- 29 CFR 1910 Subpart D and 1926 sections on walking and working surfaces, guardrails
- ANSI/ASSE Standards (e.g., Z359, Fall Protection Code series, A10.32, *Fall protection Systems for Construction and Demolition*)

b. Describe a fall protection plan for a multistory building under construction detailing which fall protection methods are applicable to what stage of construction.

c. Describe fall protection applicable to ladders and manlifts.

d. Discuss hazards of fall protection equipment, the work environment, and equipment misuse.

Mandatory Performance Activities:

e. Complete a fall protection training course that requires hands on use and inspection of fall protection equipment or provide evidence of equivalency.

21. Occupational safety personnel must demonstrate a working level knowledge of hoisting and rigging protection, including programs, training requirements, hazards and elimination or control of them.

Supporting Knowledge and Skills

a. Discuss the content and applicability of the DOE-STD-1090-2007, *Hoisting and Rigging Standard*.

b. Identify DOE, contractor and private organizations that develop standards and provide expertise in hoisting and rigging.

c. Identify hazards related to hoisting and rigging and describe safety control measures:

- Crane operations, including inspection, siting, operator qualification and load limits.
- Use of different sling configurations and their limitations (load limits, material configuration).
- Explain hazard evaluation and safety controls for critical lifts.

d. Define the following hazards and describe controls used with hoisting and rigging equipment and operations:

- Crane load tests and inspection requirements
- Effects of boom angle and length on load limits
- Major signs of stress, strain, or other deterioration that must be evaluated when inspecting rigging equipment
- Overhead power lines and other environmental and conditions hazards
- Appropriate lifting techniques and limitations, including the relationship between the crane operator and the spotter

e. Explain how suspect/counterfeit items programs affect safe hoisting and rigging.

f. Describe lessons learned from DOE fall protection accidents presented in ORPS reports.

22. Occupational safety personnel must demonstrate a familiarity level knowledge of ergonomic and human factors engineering hazards and their elimination or control.

Supporting Knowledge and Skills

a. Discuss basic ergonomics terminology.

b. Describe ergonomic considerations that must be addressed when evaluating new or existing jobs, processes, or operations, and identify appropriate methods for the elimination or control of ergonomic hazards.

c. Explain application of “single risk factors” for ergonomic hazards.

d. Discuss methodology for analyzing lifting tasks.

e. Discuss significance of repetitive motions and tasks.

f. Discuss importance of worker interfaces with operational equipment.

g. Discuss significance and definition of workplace tasks related to ergonomic consequences.

h. Discuss methods to conduct workplace evaluations and communicate results to workers and management.

i. Discuss human factors engineering as a method to identify hazards and develop controls.

23. Occupational safety personnel must demonstrate a working level knowledge of safety precautions and hazards associated with workplace chemicals and physical agents.

Supporting Knowledge and Skills

a. Discuss hazards associated with the following chemical types:

- Corrosives
- Flammable, combustible, and explosive materials
- Oxidizers
- Cryogenic liquids
- Toxic chemicals
- Asphyxiates

b. Discuss terminology associated with toxic chemical effects.

c. Describe general safety precautions that must be implemented or observed during the use, handling, storage, transportation, and disposal of each type of hazardous chemical listed above.

d. Describe relationships and hazards associated with chemicals in a confined space entry and how their presence could dictate the confined space designation. Describe a proper confined space program, including entry precautions and procedures.

e. Discuss hazards associated with chemical incompatibilities and need for segregation and containment.

f. Discuss first aid and emergency response considerations for operations involving hazardous chemicals.

g. Describe methods by which toxic compounds may enter the body and the control mechanisms available to block these routes of entry.

h. Discuss the following terms: mixture, solvent, solubility, solute, solution, and equilibrium

i. Analyze processes or operations to identify potential chemical hazards and appropriate control measures.

j. Discuss use of and considerations regarding chemical monitoring and sampling techniques.

k. Discuss major elements of a hazard communication program, laboratory safety program, and process safety management program.

24. Personnel must demonstrate a familiarity level knowledge of basic material science.

Supporting Knowledge and Skills

a. Discuss the following terms: compressibility, stress, shear, tensile strength, yield strength, and fatigue.

b. Discuss the terms: prestressed concrete, reinforcing bars, and post tension.

c. Describe the adverse effects of welding on metal, including the types of stress.

d. Describe how extremes in temperature, pressure, and other environmental factors affect material performance for metal, soils, plastics, and glass.

e. Describe facility and system degradation due to natural phenomenon hazards (NPH), fires, impact, and chemical insults.

25. Occupational safety personnel must demonstrate a familiarity level knowledge of the nuclear safety and radiological safety interfaces with occupational safety.

Supporting Knowledge and Skills

a. Discuss the applicability of occupational safety and health criteria in DOE Orders to nuclear safety.

b. Describe the potential impact of nuclear safety requirements on occupational safety matters and discuss the need for coordination between occupational safety functional area professionals, and health physicists, nuclear safety, and other involved parties..

c. Discuss “safety and analysis” process used to develop a documented safety analysis (DSA).

d. Describe the radiation protection program per 10 CFR 835 and how instrumentation and monitoring support selection of radiological safety controls.

e. Explain the use of radiological work permits and how this permit is part of a work control process.

f. Discuss how a radiation protection program and radiological controls interface with ISM and site safety programs.

26. Occupational safety personnel must demonstrate a working level knowledge of the application of basic and applied sciences to ISM.

Supporting Knowledge and Skills

a. Discuss role of mathematical tools (e.g., algebra, trigonometry, calculus, statistics, and symbolic logic) in the safety field in analyzing quantities, magnitudes, and probabilities.

b. Discuss physics laws associated with mechanics, heat, light, sound, electricity, magnetism, and radiation and application of these laws in the safety field.

c. Discuss basic chemistry concepts, including atomic structure, bonding, states of matter, chemical energy and equilibrium, and chemical kinetics. DOE-HDBK-1015/2-93, *DOE Chemistry Handbook.*

d. Discuss biological sciences, including heredity, diversity, reproduction, development, structure, and function of cells, organisms, and populations, with emphasis on human biology

e. Discuss behavioral sciences, including individual differences, attitudes, learning, perception, and group behavior and application of these in the safety field.

f. Discuss general engineering and technology disciplines, including applied mechanics, properties of materials, electrical circuits and machines, principles of engineering design and drawings, and computer science.

27. Occupational safety personnel must demonstrate a familiarity level knowledge of safety in the research and development, manufacture, use, transportation, testing, demilitarization, storage and disposal of explosives in DOE M 440.1-1A, *DOE Explosive Safety Manual.*

Supporting Knowledge and Skills

a. Describe role of hazard analysis and planning techniques for designing or evaluating explosives operations and storage.

b. Discuss importance of development, implementation, and maintenance of safe work procedures for explosives operations and storage such as site plans.

c. Explain the explosives chain addressing explosives type and quantity, environmental conditions, initiation devices and general physics of an explosion.

d. Discuss major principles of personnel protection from explosive hazards and the application of each principle to explosives operations.

e. Describe types, purpose, and application of personal protective clothing and equipment for explosives operations.

f. Describe general considerations for the storage and use of different classes of explosives and blasting agents, including the construction, capacity, and placement of facilities or operations.

g. Discuss and demonstrate ability to apply quantity-distance criteria to explosives operations.

h. Discuss hazards associated with uncontrolled electrical sources (e.g., static electricity and lightning) and application of required controls such as the following:

- Lightning protection
- Nonsparking tools
- Conductive footwear and floors
- Equipment bonding and grounding.

i. Describe fire protection considerations for explosives operations.

28. Occupational safety personnel must demonstrate a familiarity level knowledge of firearms safety and safeguards and security.

Supporting Knowledge and Skills

a. Describe how ISM applies to safeguards and security

b. Identify PPE necessary during firearms use and explain how the PPE protects against the hazards.

c. Discuss firing-range safety considerations, including required procedures and controls.

d. Discuss principles of firearms safety and describe appropriate and mandated controls, including why the armory should have no live ammunition.

e. Discuss industrial hazards (e.g., noise and lead exposures) associated with firing ranges and describe appropriate control measures.

f. Describe and apply firearms safety precautions associated with DOE safeguards and security operations and exercises, including handling and storage of ammunition.

g. Demonstrate understanding by explaining the surface danger zones and safety features of a DOE/NNSA range and how the range safety procedures for that range are implemented.

h. Describe hazards of safeguards and security programs, including hazards associated with protective forces.

i. Describe scope and applicability of DOE directives applicable to safeguards and security highlighting how these affect worker safety such as DOE M 470.4-3A, *Contractor Protective Force* and DOE M 470.4-8, *Federal Protective Force*.

29. Occupational safety personnel must demonstrate a familiarity level knowledge of DOE contract management and administration sufficient to interface with contract officer and those contracted in areas of occupational safety.

Supporting Knowledge and Skills

a. Discuss key elements of contractual relationships between DOE and contractors and the impact of cost estimates and budget on project safety.

b. Describe the role of DOE's occupational safety professional with respect to the evaluation of contractor occupational safety programs for the performance based incentives, cost-plus award fee process or other performance rating processes.

c. Describe responsibilities of a DOE occupational safety professional associated with contractor compliance with the Price Anderson Amendments Act and describe its penalties and fees as regulated in Price Anderson Amendments Act, 10 CFR 830 and 10 CFR 851.

d. Discuss a program's budget, schedule, appropriateness, and impact on occupational health protection, using actual for an occupational safety program.

e. Identify appropriate contract mechanisms and channels that must be employed or considered when communicating with or directing DOE contractors (e.g., describe appropriate procedures and considerations for issuing a stop work order to a DOE contractor).

Mandatory Performance Activities:

f. Explain DOE O 226.1B, *Implementation of Department of Energy Oversight Policy* as it applies to evaluating contractor performance against contract requirements, including that of sub-tier contractors.

30. Occupational safety personnel must demonstrate a working level knowledge of industrial hygiene hazards and controls.

Supporting Knowledge and Skills

a. Describe industrial hygiene programs, including health effects, instrumentation and monitoring, and safety controls.

b. Discuss how IH program and controls interface with ISM and site safety programs.

c. Discuss industrial hygiene fundamentals in terms of:

- Basic terminology
- Nature, recognition, evaluation and control of hazards
- Necessary elements for implementing and maintaining an effective industrial hygiene program

d. Describe sources of nonionizing radiation, including lasers and the hazards of equipment and its use.

e. Describe hazards, sampling and monitoring and controls for laboratory and production operations.

f. Discuss an industrial hygiene workplace assessment that includes developing a sampling and analysis plan and performing sampling.

g. Discuss hazards and controls for beryllium in 10 CFR 850, “Chronic Beryllium Disease Prevention Program (CBDPP)”.

31. Occupational safety personnel must demonstrate a familiarity level knowledge of the use and function of worker protection safety testing and measurement equipment.

Supporting Knowledge and Skills

a. Discuss the use, limitations, and function of worker protection safety testing equipment (e.g., oxygen meters, explosive atmosphere meters, electrical test equipment, illumination meters, and calipers).

b. Discuss the need for proper metering equipment maintenance and calibration.

c. Describe the circumstances requiring use of each type of equipment.

d. Describe the appropriate actions taken in response to various readings from each type of equipment.

e. Describe the appropriate application and function of industrial hygiene monitoring and sampling equipment and discuss required safety interfaces.

f. Demonstrate the use of three metering instruments applicable to your duty functions.

g. Explain how the instrument readings are translated into information describing the quality and adequacy of the related safety program(s) and effectiveness of the implemented controls.

32. Occupational safety personnel must demonstrate a familiarity level knowledge of occupational medicine program and how it supports safety programs.

Supporting Knowledge and Skills

a. Describe how the following regulations and orders integrate occupational medicine into safety: 29 CFR 1910, 29 CFR 1926, 10 CFR 851, 10 CFR 850, 10 CFR 707, and 10 CFR 712.

b. Describe conduct and documentation requirements associated with surveillance physicals.

c. Describe fitness for duty and return to work practices and documentation.

d. Describe the purpose and conduct of routine pre- and separation/post-employment physicals.

e. List mandated physicals and its documentation, including human reliability, Department of Transportation, and firefighter physicals.

f. Explain how occupational medicine providers advise management on possible alternatives for less hazardous chemicals and process, and preparation for appropriate emergency care and treatment if hazards cannot be attenuated.

g. Discuss OSHA recordability determinations accomplished for OSHA record keeping.

h. Discuss workers compensation program and medical documentation requirements.

i. Describe purpose of travel physicals and pre-travel, and post-travel counseling, "GO Kits" and post travel treatments if needed.

j. List appropriate immunizations for work with biological agents and for international travel.

k. Describe Employee Assistance Program (EAP).

l. Describe participation in and determination of duties in regards to 10 CFR 707, “Workplace Substance Abuse Program”.

33. Occupational safety personnel must demonstrate a working level knowledge of conduct of operations and familiarity with configuration management.

Supporting Knowledge and Skills

a. Complete a course or demonstrate equivalent learning in DOE O 422.1, *Conduct of Operations.*

b. Explain how effective conduct of operations supports safety by comparing the CONOPS requirements to ISMS, 10 CFR 830, 10 CFR 851, and quality program principles.

c. Describe how implementing DOE-STD-1073-2003, *Configuration Management* contributes to process system safety.

d. Discuss conduct of maintenance (DOE O 433.1B) principles and DOE requirements to ensure maintenance is performed in a safe and efficient manner.

e. Describe concepts of process safety and explain how these reduce production and safety risks.

Mandatory Performance Activities:

f. Draft a safety program assessment plan that links CONOPs guidance with assessment criteria derived from regulatory and DOE directives for a safety functional area

34. Occupational safety personnel must demonstrate a familiarity level knowledge of mechanical systems operations and methods of failure that create hazards.

Supporting Knowledge and Skills

a. Describe valve terms, design, functioning, and safety considerations

b. Describe pump terms, design, functioning, and safety considerations.

- Safety and pressure relief devices
- Types of valve operators
- Basic types of instrumentation

c. Discuss engineering prints and drawings and the demonstrate ability to read and interpret As-built drawings and piping and instrumentation diagrams (P&ID).

d. Using an engineering print, identify the symbols used in piping and instrumentation diagrams:

- How types of lines represent physical components.
- Title block information, including notes, legend, revision block and drawing
- Types of valves
- Types of valve operators
- Basic types of instrumentation and mechanical equipment

e. Identify how valve conditions are depicted and determine system flow path for a given valve lineup.

f. Discuss the working of components, operations and theory of pneumatic systems.

g. Define the following terms as they relate to piping systems:

- Pipe schedule
- Water hammer
- Hydrostatic test pressure
- Laminar flow
- Turbulent flow

h. Discuss the hazards of incompatible materials, corrosion, and inadequate design.

i. Discuss theory and operation of heating, ventilation, and air conditioning (HVAC) systems, including gloveboxes and fume hoods.

APPENDIX A: CONTINUING EDUCATION, TRAINING, AND PROFICIENCY PROGRAM

Headquarters or field element managers must ensure the following:

1. Establish expectations related to the performance of duties and responsibilities in this FAQS, considering regulatory and/or contractual requirements as appropriate.
2. Identify specific continuing training requirements in the site/office/position specific qualification standard(s) or procedures.
3. Approve all established continuing training requirements related to defense nuclear facility safety oversight as determined for their office or site.

Periodic requalification to this standard is not required.

Occupational safety personnel must complete continuing technical education and/or training covering topics directly related to the Occupational Safety FAQS as determined by the appropriate headquarters or field element managers as follows:

1. Address changes to DOE directives, guides, standards, policies, and rules since the last qualification was completed.
2. Perform practical factor exercises as appropriate, especially those that are mandatory and others as required by the associated FAQS.
3. Attend seminars, symposia, or technical meetings related to occupational safety as resources are available.

   Note: Continuing technical education and/or training may include courses/training provided by the DOE, 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, and current technical issues related to the associated FAQS. Where continuing education is mandatory for maintaining professional registration (e.g., Professional Engineer) or professional certification (e.g., Certified Health Physicist), this will normally be sufficient, and only needs to be augmented by DOE directives reviews and any site-specific requirements (e.g., new/revised DSAs).

REFERENCES

1. Government Documents

   a. DOE O 426.1, *Federal Technical Capability*
   b. DOE P 450.4A, *Integrated Safety Management Policy*
   c. DOE O 450.2, *Integrated Safety Management*
   d. DOE Order 440.1B, *Worker Protection for DOE Federal Employees* and supporting implementation guides (DOE Guide 440.1-X series).
   e. DOE O 232.1A, *Occurrence Reporting and Processing of Operations Information*
   f. DOE O 231.1A, *Environment, Safety and Health Reporting*
   g. DOE O 420.1B, *Facility Safety*
   h. DOE O 414.1D, *Quality Assurance*
   i. DOE O 226.1B, *Implementation of Department of Energy Oversight Policy*
   j. DOE O 225.1B, *Accident Investigations*
   k. Executive Order 12196, "Occupational Safety and Health Programs for Federal Employees"
   l. 10 Code of Federal Regulations, Part 851, "Worker Safety and Health Program"
   m. *29 Code of Federal Regulations,* Part 1904, "Recording and Reporting Occupational Injuries and Illnesses"
   n. 29 Code of Federal Regulations, 1910, "Occupational Safety and Health Regulations"
   o. 29 Code of Federal Regulations, 1926, "Safety and Health Regulations for Construction"
   p. 29 Code of Federal Regulations, 1960, "Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters"
   q. Price Anderson Amendments Act.
   r. Public Law 91-596, "Occupational Safety and Health Act of 1970"
   s. U. S. Office of Personnel Management, *Qualification Standards for General Schedule Positions Operating Manual.*
   t. DOE Technical Standards Program, including other Functional Area Qualification Standards
   u. DOE-STD-1090-07, *Hoisting and Rigging* (Formerly Hoisting and Rigging Manual)
   v. DOE-STD-1120-98*, Integration of Environment, Safety, and Health into Facility Disposition Activities*
   w. DOE Handbooks

2. Other Documents and Organizations

   - National Fire Protection Association (NFPA)
   - NFPA 70, National Electric Code
   - NFPA 70E, Standard for Electrical Safety in the Workplace
   - NIOSH
   - American Conference of Government Industrial Hygienists
   - Board of Certified Safety Professionals support information for Certified Safety Professionals [www.bcsp.org]

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CONCLUDING MATERIAL

Review Activity:
EM
NNSA
NE
SC

Preparing Activity:
NNSA

Project Number:
TRNG-0078

Field and Operations Offices:
CBFO
CH
ID
ORO
ORP
RL
SR

Site Offices:
Argonne Site Office
Brookhaven Site Office
Fermi Site Office
Kansas City Site Office
Livermore Site Office
Los Alamos Site Office
NNSA Service Center
Nevada Site Office
Pantex Site Office
Savannah River Site Office
Sandia Site Office
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