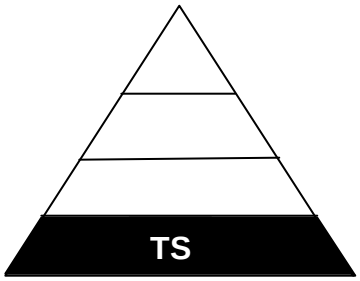

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DOE–STD–1166-2003
September 2003

DOE STANDARD

DEACTIVATION AND DECOMMISSIONING FUNCTIONAL AREA QUALIFICATION STANDARD

DOE Defense Nuclear Facilities Technical Personnel

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

AREA TRNG

APPROVAL

The Federal Technical Capability Panel consists of senior Department of Energy 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.

Roy J. Schepens
Chairman
Federal Technical Capability Panel

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TABLE OF CONTENTS

ACKNOWLEDGMENT

The Office of Environmental Management is the Sponsor for the Deactivation and Decommissioning Qualification Standard. The Sponsor is responsible for coordinating the development and/or review of the Functional Area Qualification Standard by subject matter experts to ensure that the technical content of the standard is accurate and adequate for Department-wide application for those involved in the Deactivation and Decommissioning Program. The Sponsor, in coordination with the Federal Technical Capability Panel, is also responsible for ensuring that the Functional Area Qualification Standard is maintained current.

The following subject matter experts (SMEs) participated in the development and/or review of this Qualification Standard:

Andy Szilagyi	Office of Environmental Management (EM-22)
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DOE-STD-1166-2003

U.S. DEPARTMENT OF ENERGY
FUNCTIONAL AREA QUALIFICATION STANDARD

FUNCTIONAL AREA

Deactivation and Decommissioning

PURPOSE

DOE M 426.1-1, Federal Technical Capability Manual, 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, interviewing questions, and other criteria associated with the recruitment, selection, and internal placement of technical personnel. Office of Personnel Management minimum qualifications standards will be greatly enhanced by application of appropriate materials from the technical Functional Area Qualification Standards.

The Technical Qualification Standards are not intended to replace the OPM Qualifications Standards nor other Departmental personnel standards, rules, plans, or processes. The primary purpose of the Technical Qualification Program is to ensure that employees have the requisite technical competency to support the mission of the Department. The Technical Qualification Program forms the basis for the development and assignment of DOE personnel responsible for ensuring the safe operation of defense nuclear facilities.

APPLICABILITY

The Deactivation and Decommissioning Functional Area Qualification Standard establishes common functional area competency requirements for Department of Energy personnel who provide assistance, direction, guidance, oversight, or evaluation of contractor technical activities that could impact the safe operation of DOE's defense nuclear facilities. The technical Functional Area Qualification Standard has been developed as a tool to assist DOE Program and Field offices in the development and implementation of the Technical Qualification Program in their organization. For ease of transportability of qualifications between DOE elements, Program and Field offices are expected to use this technical Functional Area Qualification Standard without modification or additions. Needed additional office/site/facility specific technical competencies should be handled separately. Satisfactory and documented attainment of the competency requirements contained in this technical Functional Area Qualification Standard ensures that personnel possess the requisite competence to fulfill their functional area duties and responsibilities. Office/Facility-Specific Qualification Standards supplement this technical Functional Area Qualification Standard and establish unique operational competency requirements at the Headquarters or Field element, site, or facility level.

IMPLEMENTATION

This technical Functional Area Qualification Standard identifies the minimum technical competency requirements for Department of Energy personnel. Although there are other competency requirements associated with the positions held by DOE personnel, this Functional Area Qualification Standard is limited to identifying the specific technical competencies. The competency statements define the expected knowledge and/or skill that an individual must meet. Each of the competency statements is further explained by a listing of supporting knowledge and/or skill statements.

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 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.

Headquarters and Field elements shall establish a program and process to ensure that DOE personnel possess the competencies required of their position. That includes the competencies identified in this technical Functional Area Qualification Standard. Documentation of the completion of the requirements of the Standard shall be included in the employee's training and qualification record.

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 Technical Qualification Program Plan of the office qualifying the individual. The supporting knowledge and/or skill statements, while not requirements, should be considered before granting equivalency for a competency.

Training shall be provided to employees in the Technical Qualification Program who do not meet the competencies contained in the technical Functional Area 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. Departmental training will be based upon appropriate supporting knowledge and/or skill statements similar to the ones listed for each of the competency statements. 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 Functional Area Qualification Standard competency statements.

EVALUATION REQUIREMENTS

Attainment of the competencies listed in this technical Functional Area Qualification Standard should be documented by a qualifying official, immediate supervisor, or the team leader of personnel in accordance with the Technical Qualification Program Plan of the office qualifying the individual.

CONTINUING EDUCATION, TRAINING AND PROFICIENCY

DOE 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:

- Department of Energy
- 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 proficiency activities, and the requirements for the continuing education and training program for deactivation and decommissioning personnel 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 Deactivation and Decommissioning Functional Area:

A. Maintain communication with Headquarters, field elements, regulatory agencies, the public and other stakeholders.

B. Inform Department of Energy management of applicable deactivation and decommissioning project status, activities, and issues.

C. Plan, observe and evaluate deactivation and decommissioning activities and contractor performance to ensure the adequacy and effectiveness of contractor programs such as:
   - Technical performance
   - Plans, policies, and procedures
   - Management controls.
   - Worker training and qualification programs
   - Occurrence Reporting and Corrective actions
   - Worker and public health and safety programs
   - Environmental protection and regulatory compliance
   - Waste treatment, storage, and disposal programs and transportation programs

D. Develop, review, and assess deactivation and decommissioning documentation.

E. Develop, manage, and assist in the negotiations for regulatory agreements and permits.

F. Resolve or facilitate the resolution of deactivation and decommissioning issues.

G. Develop, implement, and evaluate deactivation and decommissioning strategic, baseline, project, and program plans.

H. Promote the sharing of information and technology.

I. Conduct site-specific technology implementation evaluations.

J. Evaluate the adequacy and effectiveness of contractor deactivation and decommissioning programs to ensure program compliance with Department Orders, standards, guides; Federal regulations, statutes, codes; and applicable state and/or local regulations.

Position-specific duties and responsibilities for deactivation and decommissioning personnel are contained in their Office/Facility-Specific Qualification Standard or Position Description.

BACKGROUND AND EXPERIENCE

The U. S. Office of Personnel Management's Qualification Standards Handbook 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 deactivation and decommissioning personnel is:

1. Education:

   Bachelor of Science degree in engineering or a related discipline; or meeting the alternative requirements specified for engineers or scientists in the Qualifications Standards Handbook.

2. Experience:

   Industrial, military, Federal, State or other directly related background that has provided specialized experience in decommissioning. Specialized experience can be demonstrated through possession of the competencies outlined in this Standard.

REQUIRED TECHNICAL COMPETENCIES

The competencies contained in this Standard are distinct from those competencies contained in the General Technical Base Qualification Standard. All deactivation and decommissioning (D&D) personnel must satisfy the competency requirements of the General Technical Base Qualification Standard prior to or in parallel with the competency requirements contained in this Standard. Each of the competency statements defines the level of expected knowledge and or skill that an individual must posses to meet the intent of this Standard. The supporting knowledge and/or skill statements further describe the intent of the competency statements.

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

General Technical

1. D&D personnel shall demonstrate a familiarity level knowledge of the requirements for the use of personal protective equipment (PPE).

Supporting Knowledge and/or Skills

a. Describe the four levels of protection as defined by the Environmental Protection Agency for workers at hazardous waste sites or for workers conducting emergency response activities.

b. Describe the general principles used by ES&H staff to determine the selection, use, and limitations of PPE; demonstrate proper donning/doffing of PPE.

c. Describe the prerequisites for the use of respiratory protection equipment.

d. Discuss the process for ES&H to inform workers and oversight personnel of the requirements for PPE for planned D&D activities.

2. D&D personnel shall demonstrate a working level knowledge of the safety-related requirements for hazardous materials.

Supporting Knowledge and/or Skills

a. Discuss the hazards and general safety precautions associated with the use and dismantlement of equipment or facilities containing or contaminated with hazardous materials such as corrosives (acids and alkalis), beryllium, lead, asbestos, heavy metals, radioactive materials, combinations of hazardous materials, and combinations of hazardous materials with radioactive materials.

b. Describe the criteria used to determine if a material is a health hazard, and discuss the methods by which toxic compounds may enter the body.

c. Discuss the general safety precautions regarding the use, handling, and storage of compressed gases, including hydrogen, oxygen, nitrogen, and fuels such as acetylene and liquefied petroleum gases, cryogenic liquids, and flammable and combustible liquids.

3. D&D personnel shall demonstrate a working level knowledge of surveys for hazardous and radioactive materials for D&D facilities.

Supporting Knowledge and/or Skills

a. Describe the various types of D&D surveys typically performed for planning and implementation of D&D. For each type, discuss the purpose and scope, the users of the results, and the process for planning and implementation.

b. Discuss the techniques for sampling and monitoring the environment that may be needed during D&D. (For example, groundwater, air, runoff.)

c. Describe the purpose of a Quality Assurance Project Plan.

d. Describe the Environmental Protection Agency's Data Quality Objectives process, and discuss its applicability to D&D activities.

e. Describe the purpose, scope, and application of the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM).

f. Demonstrate an understanding of a sampling plan including Data Quality Objectives (DQO's), the review and approval process, quality assurance, and laboratory and equipment certifications and calibrations.

g. Discuss field measurement methods and instrumentation.

4. D&D personnel shall demonstrate a working level knowledge of safety practices associated with construction, deactivation, and decommissioning of defense nuclear facilities.

Supporting Knowledge and/or Skills

a. Explain basic safety practices used on construction sites. Include a discussion of the purpose and importance of using hard hats, eye protection, and hearing protection.

b. Describe the basic operation and hazards associated with operating and the D&D of:

- pneumatic systems
- hydraulic systems.

c. Describe planning and implementation precautions to consider when determining if systems, containers, and tanks are pressurized.

d. Describe the hazards associated with:

- compressed air
- compressed air tools
- working with or near overhead cranes
- portable power tools
- confined spaces.

5. D&D personnel shall demonstrate a familiarity level knowledge of basic operations and D&D fundamentals for utility and other infrastructure systems.

Supporting Knowledge and/or Skills

a. Discuss the use, key components, and any special D&D planning considerations for the

following installed systems: natural gas, liquefied petroleum gas, electric, alarms, plant air, steam, inerting gases, oxygen and other gases, potable water, fire suppression (water, CO2, Halon, etc.), steam, sewage, stormwater, and groundwater drains.

b. Discuss the process for identifying, planning, and controlling the facility infrastructure before and during D&D activities including underground utilities, retention tank lines, process piping, neighboring facilities, fire protection, and structural integrity.

- Discuss the safety impacts and mitigation strategies when mechanical, electrical, ventilation, alarms, and fire suppression systems are disabled.

c. Describe the protection provided by fuses, circuit breakers, and ground fault circuit interrupters (GFCI) on installed circuits and extension cords.

d. Describe the importance of lock out and tag out programs for D&D projects.

6. D&D personnel shall demonstrate a familiarity level knowledge of erosion, groundwater movement, and contaminant transport in soil as they relate to D&D activities.

Supporting Knowledge and/or Skills

a. Define erosion. Describe the characteristics and effects of water and wind erosion and their implication to a D&D project. Discuss common erosion control techniques that could be used during D&D.

b. Discuss several examples of when groundwater could be of concern to a D&D project.

c. Discuss the potential impacts from ground water contaminated with radioactive or hazardous materials that should be considered during D&D planning and implementation.

7. D&D personnel shall demonstrate a working level knowledge of basic heating, ventilation, and air conditioning system (HVAC) operations, the potential of these systems to be hazard sources, and the relationship of these systems to contaminant transfer.

Supporting Knowledge and/or Skills

a. Given a one-line diagram of an HVAC system, identify and discuss the purpose of the following components:

- Compressors
- Blowers
- Dampers
- Chillers
- Filters and filter plenums
- Heat exchangers
- Scrubbers
- Gloveboxes and hoods
- HVAC instrumentation.

b. Discuss the significance of the following system parameters:

- Positive versus negative system pressure
- Differential pressure across filters
- Differential pressure across components.

c. Describe the general sequence for removing an HVAC system for D&D of a contaminated glovebox. Discuss methods for minimizing 1) the threat of release of contamination, and 2) potential health and safety impacts.

8. D&D personnel shall demonstrate a familiarity level knowledge of process instrumentation principles of operation, purpose and uses.

Supporting Knowledge and/or Skills

a. Discuss the purpose and provide an example of how each of the following may be used during D&D activities: tank sight glass, thermometer, pressure gauge, overflow alarm, overfill alarm, flow rate instruments, and differential pressure gauge.

b. Discuss the importance of not disregarding indicators and alarms.

9. D&D personnel shall demonstrate a working level knowledge of the basic principles and concepts of building demolition and identify potential sources of physical hazards.

Supporting Knowledge and/or Skills

a. Describe the common D&D methods and any material specific concerns for structures that have the following types of construction:

- Brick and mortar
- Poured concrete and pre-stressed concrete
- Asbestos containing materials including panels, flooring, ceilings and roofing
- Layered (built up roofing)
- Wood framed
- Metal/metal framed.

b. Describe common D&D methods for demolition of:

- chimneys/stacks
- underground structures such as footers, pilings, bunkers, tunnels, multi-story basements.

c. Discuss the effects of the following types of radiation on the structural integrity of metals:

- Alpha
- Beta
- Gamma
- Neutron.

d. Explain why understanding and evaluating corrosion is important during the planning and execution of a D&D project.

e. Conduct a walkthrough of a work site to identify physical hazards.

10. D&D personnel shall demonstrate an expert level knowledge of the basic principles and methods of decontamination.

Supporting Knowledge and/or Skills

a. Discuss the key factors (such as health and safety, ALARA, efficiency, primary and secondary waste disposal, and costs) used to determine which commonly used decontamination methods could be used for each of the following surfaces contaminated with radioactive or hazardous substances.

- Stainless steel
- Carbon steel
- Leaded glass
- Concrete
- Painted surfaces
- Asbestos containing material
- Plastics.

Regulatory

11. D&D personnel shall demonstrate a working level knowledge of the purpose and requirements of DOE O 420.1A, Facility Safety, and DOE P 450.4, Safety Management Policy.

Supporting Knowledge and/or Skills

a. Describe the purpose, scope, and application of the requirements in DOE O 420.1A, Facility Safety.

b. Describe the purpose, scope, and application of the requirements in DOE P 450.4, Safety Management Policy.

c. Discuss the relationship of DOE P 450.4, Safety Management Policy to the Department of Energy Acquisition Regulations (DEAR).

d. List and explain the five core functions set forth in the Safety Management System policy or conduct a review of a work package or D&D plan for Integrated Safety Management implementation.

e. Describe the Integrated Safety Management System (ISMS) Objective.

f. List and explain the seven guiding principles of the Safety Management System policy, including their relationship to the five core functions of the Safety Management System policy.

g. Given the Integrated Safety Management System (ISMS) guide, discuss the process used by DOE and the D&D contractor for integrating ISMS into facility disposition activities.

12. D&D personnel shall demonstrate an expert level knowledge of the purpose and guidance given in DOE-STD-1120-98, Integration of Environment, Safety, and Health into Facility Disposition Activities.

Supporting Knowledge and/or Skills

a. Identify the Federal Regulation requiring integration of environment, safety and health into work planning and execution.

b. Discuss the five types of hazard baseline documents that support facility disposition activities.

c. Identify the five criteria for determining when a “Readiness Evaluation” should be performed for facility disposition activities.

d. Describe the Management of Change process that should be implemented for facility disposition activities.

e. Explain why performance indicators and measures are particularly important to the facility disposition process.

13. D&D personnel shall demonstrate working level knowledge of the Occupational Safety and Health Act (OSHA) requirements in the following documents:

- **DOE Order 440.1A, Worker Protection Management for DOE Federal and Contractor Employees**
- **29 CFR 1910, Occupational Safety and Health Standards**
- **29 CFR 1926, Safety and Health Regulations for Construction.**

Supporting Knowledge and/or Skills

a. Discuss the application and impact of OSHA on DOE D&D projects.

b. Discuss the requirements in OSHA that form the basis of authority for project management personnel in the oversight and management of a project.

c. Discuss the project manager responsibilities set forth in DOE Order 440.1A, Worker Protection Management for DOE Federal and Contractor Employees.

d. Discuss the construction contractor's responsibilities under DOE 440.1A, Worker Protection Management for DOE Federal and contractor employees for:

- Establishing a safety program
- Safety training for employees
- Worksite presence during work activities
- Compliance by subcontractors
- Response to an identified safety and/or health hazard.

e. Discuss the requirements for the performance of a hazard analysis and a hazard abatement/prevention program. Include in the discussion each of the following elements:

- Responsibility for implementation
- Purpose and content of the hazard analysis
- Worker awareness of the hazards and hazard abatement/prevention program.

f. Discuss the project manager's responsibility for on-site safety and health inspections.

14. D&D personnel shall demonstrate working-level knowledge of the process for Unreviewed Safety Questions per 10 CFR 830, Subpart B, Nuclear Safety

Management, requirements.

Supporting Knowledge and/or Skills

a. Describe the situations that require a safety evaluation to be performed.

- Discuss the reasons for performing an unreviewed safety question determination.

b. Define the conditions for an unreviewed safety question and discuss the actions required if a USQ is identified.

c. Describe the responsibilities of contractors authorized to operate defense nuclear facilities for the performance of safety evaluations.

d. Describe the action(s) to be taken by a contractor upon identifying information that indicates a potential inadequacy of previous safety analyses or a possible reduction in the margin of safety as defined in the technical safety requirements.

e. Define the following terms:

- Accident analyses
- Safety evaluation
- Technical safety requirements.

15. D&D personnel shall demonstrate working-level knowledge of the technical safety requirements as described in 10 CFR 830, Subpart B, Nuclear Safety Management, requirements.

Supporting Knowledge and/or Skills

a. Discuss the purpose of technical safety requirements.

b. Describe the responsibilities of contractors authorized to operate defense nuclear facilities for technical safety requirements.

c. Define the following terms and discuss the purpose of each:

- Safety limit
- Limiting control settings
- Limiting conditions for operation
- Surveillance requirements.

d. Describe the process for determining the level of safety documentation (SAR, BIO, HASP, etc.) required for initiating a D&D project.

e. Discuss the conditions that constitute a violation of the technical safety requirements and state the reporting requirements should a violation occur.

16. D&D personnel shall demonstrate a familiarity level knowledge of Department of Energy radiation protection requirements for radiation protection of workers, the public, and the environment including related requirements sufficient to assess the effectiveness of radioactive material containment, exposure control, and radiological work practices.

Supporting Knowledge and/or Skills

a. Describe and explain the radiological concerns in the design, construction, and operation of containment and confinement systems.

b. Discuss the design and operational characteristics of containment and confinement systems that minimize personnel radiation exposure.

c. Discuss the relevant Departmental requirements related to the following radiological control elements:

- Contamination control
- Radiation work permits
- Radiation safety training
- Posting and labeling
- Respiratory protection
- Records
- X-Ray generating device.

17. D&D personnel shall demonstrate familiarity level knowledge of DOE Order 231.1A, Environment, Safety, and Health Reporting, and DOE Manual 231.1-2, Occurrence Reporting and Processing of Operations Information.

Supporting Knowledge and/or Skills

a. State the purpose of the Order and the Manual.

b. Discuss the Department's policy regarding the reporting of operational occurrences as outlined in the Order and the Manual.

c. Describe the actions that must be taken immediately following an occurrence.

d. Define the following terms:

- Operational Emergency
- Significance Category 1 Occurrence
- Significance Category R Occurrence
- Significance Category 2 Occurrence
- Significance Category 3 Occurrence
- Significance Category 4 Occurrence
- Notification
- Occurrence report
- Reportable occurrence.

18. D&D personnel shall demonstrate an expert level knowledge of the purpose and requirements of DOE O 430.1A, Life Cycle Asset Management.

Supporting Knowledge and/or Skills

a. Describe the purpose, scope, and application of the D&D specific requirements detailed in DOE O 430.1A, Life Cycle Asset Management.

b. Discuss the process and requirements for disposition of physical assets, including the specific requirements for contaminated facility disposition.

19. D&D personnel shall demonstrate a familiarity level knowledge of environmental laws and regulations related to D&D.

Supporting Knowledge and/or Skills

a. Explain the purpose and application of each of the following to D&D activities.

- Clean Air Act
- Safe Drinking Water Act
- National Pollution Discharge Elimination System
- Endangered Species Act
- National Historic Preservation Act
- Federal Water Pollution Control Act (Clean Water Act)
- Natural Resource Damage Assessment
- National Contingency Plan
- Oil Pollution Act of 1990.

20. D&D personnel shall demonstrate a familiarity level knowledge of the management and negotiation of regulatory agreements, permits, and compliance actions.

Supporting Knowledge and/or Skills

a. Discuss the requirements, methods of negotiation, and management of the following:

- Federal facility agreements
- Consent Order and Settlement Agreement
- Record Of Decision
- Resource Conservation and Recovery Act permit
- Site treatment plan
- Notice of Violation (RCRA)
- CERCLA decision documents (for example, documents needed to obtain approval and implement a non-time critical removal)
- National Priority List.

b. Negotiate or discuss individually or as part of a team regulatory compliance or permitting topics.

21. D&D personnel shall demonstrate an expert level knowledge of the RCRA corrective action process and the CERCLA remediation process as they apply to conducting D&D activities.

Supporting Knowledge and/or Skills

a. Discuss the use of the non-time critical removal action process as it applies to conducting decommissioning activities.

b. Describe the circumstances under which a DOE D&D activity would not be done as a non-time critical removal action, and the need for clearly defining the project and regulatory boundaries between operations, deactivation, decommissioning, and environmental restoration.

c. Discuss the use of the RCRA corrective action process for conducting D&D activities.

d. Discuss 1) the establishment of cleanup levels, 2) the use of Applicable, or Relevant and Appropriate Requirements (ARARs), and 3) "To-Be-Considered" (TBC) guidelines at CERCLA sites.

e. Describe the circumstances under which RCRA hazardous waste and TSCA PCB management and disposal requirements are applicable at CERCLA cleanup sites.

f. Describe the use of a Determination of No Further Action (DNFA).

22. D&D personnel shall demonstrate a familiarity level knowledge of the development and applicability of the following National Environmental Policy Act (NEPA) documentation.

- **EIS, Environmental Impact Statement**
- **EA, Environmental Assessment**
- **FONSI, Finding of No Significant Impact**
- **CX, Categorical Exclusion**
- **ROD, Record of Decision.**

Supporting Knowledge and/or Skills

a. Describe the purpose for each of the listed documents and the circumstances under which each is used.

b. Discuss the requirements for each document and describe the process for reviewing the listed documents.

c. Define "functional equivalent of NEPA compliance" and discuss when it is appropriate to use it for D&D activities.

d. Complete a review of a NEPA document.

23. D&D personnel shall demonstrate a working level knowledge of the waste management requirements of the Resource Conservation and Recovery Act, the Hazardous and Solid Waste Amendments (HSWA) to RCRA, and CERCLA/SARA.

Supporting Knowledge and/or Skills

a. Describe the purpose and scope of the Resource Conservation and Recovery Act (RCRA).

b. Provide examples of some of the hazardous wastes that may be generated during a D&D project.

c. Discuss the requirements of 40CFR260, Hazardous Waste Management System - General, through 40CFR270, EPA Administrated Permit Programs: The Hazardous Waste Permit Program, as applied to D&D.

d. Describe the requirements of 40CFR273, Subpart A applicable to the management of hazardous batteries, pesticides, and mercury-containing thermometers.

e. Describe the primary differences between RCRA Subtitle C and D landfills.

f. Discuss the general requirements for waste management (treatment, storage, and disposal) at CERCLA sites.

24. D&D personnel shall demonstrate familiarity level knowledge of the packaging and transportation of waste as described in:

- **DOE Order 460.1A, Packaging and Transportation Safety**
- **DOE Order 460.2, Departmental Materials Transportation and Packaging Management**
- **49 CFR Parts 106-199, Hazardous Material Regulations of the Department of Transportation**
- **40 CFR Parts 262-263, Resource Conservation and Recovery Act.**

Supporting Knowledge and/or Skills

a. Discuss the requirements of the Hazardous Materials Transportation Act as they relate to the packaging and transportation of waste.

b. Describe the general requirements for shipping containers.

c. Discuss the requirements of the Resource Conservation and Recovery Act (40 CFR 262, Standards Applicable to Generators of Hazardous Waste, and 40 CFR 263, Standards Applicable to Transporters of Hazardous Waste) as they pertain to the packaging and shipping of waste.

d. Discuss the general labeling, placarding, and shipping requirements specified in the requirements of 49 CFR (Placarding, Labeling, and Shipping).

e. Discuss the requirements for shipping Low-Specific Activity (LSA) waste and Surface Contaminated Object (SCO).

25. D&D personnel shall demonstrate working level knowledge of issues and concerns surrounding the control of materials removed from a facility during D&D.

Supporting Knowledge and/or Skills

a. State the Department's policy and discuss the objectives regarding the protection of the public and the environment from radiation as contained in DOE O 5400.5.

b. List and discuss the factors that must be considered pertaining to the release of materials and equipment having residual radioactive material as outlined in DOE O 5400.5, Chapter IV, Residual Radioactive Material Cleanup.

c. Describe the following types of controlled storage locations including the general requirements for their operation (waste accumulation area, satellite accumulation area, staging pile, Corrective Action Management Unit, Temporary Unit).

d. Conduct a walkthrough or describe the concerns associated with temporarily staged materials awaiting final characterization. (Consider compatibility, controlling vermin and poisonous animals, physical control, security, accountability, and erosion.)

26. D&D personnel shall demonstrate familiarity-level knowledge of the management of radioactive waste as described in:

- **DOE Order 435.1, Radioactive Waste Management**
- **DOE M 435.1-1, Radioactive Waste Management.**

Supporting Knowledge and/or Skills

a. Define the following terms:
   - high-level waste
   - low-level waste
   - transuranic waste
   - mixed waste
   - low-specific activity.

b. Discuss the waste disposal significance to a D&D project created by generating low-level mixed waste liquids determined to be between 10 to 100 nanocuries.

c. Discuss the Department's performance objectives and performance assessment for disposal of low-level radioactive waste as outlined in DOE M 435.1-1, Radioactive Waste Management.

d. Discuss waste characterization requirements and their relevance to disposal facility waste acceptance criteria and to DOT transportation requirements.

27. D&D personnel shall demonstrate a working knowledge of the purpose and guidance given in the following implementation guides supporting DOE O 430.1A, Life Cycle Asset Management:

- **DOE G 430.1-5, Transition Implementation Guide**
- **DOE G 430.1-2, Surveillance and Maintenance During Facility Disposition**
- **DOE G 430.1-3, Deactivation Implementation Guide**
- **DOE G 430.1-4, Decommissioning Implementation Guide.**

Supporting Knowledge and/or Skills

a. Describe the overall facility disposition process, including the transition, deactivation, decommissioning, and surveillance and maintenance phases.

b. Discuss the purpose and applicability of each of the implementation guides.

c. Identify the top-level project management objectives that apply to facility disposition activities.

d. Discuss the “end point methodology” as used in the detailed engineering planning of facility disposition.

28. D&D personnel shall demonstrate a working level knowledge of financial and project management necessary to provide project oversight of D&D activities. (Ref. DOE Order 413.3, Project Management, and 430.1A, Life Cycle Asset Management.)

Supporting Knowledge and/or Skills

a. Define the term and discuss the process for developing a “Work Breakdown Structure” (WBS) and a project schedule.

b. Define and compare the terms

   - "cost estimate", "budget”, and “life cycle cost estimate”
   - “WBS” and project “scope”

- "labor costs" and "non-labor costs"
- "direct costs" and "indirect costs".

c. Describe the process for preparing cost estimates and budgets. Review a submittal of a cost estimate or budget for D&D activity or work.

d. Discuss methods of reducing indirect costs.

e. Discuss the process to prepare and justify preliminary field budget submissions, Project Data Sheets, and other out year funding actions necessary to initiate and complete multi-year funding for a D&D project.

f. Discuss the importance of determining the measure for work performed before work starts. Describe several methods for measuring Earned Value for D&D activities and the strengths and weaknesses of each.

g. Describe the types of data required to forecast cost and schedule performance.

h. Given actual project management documentation and data, identify and define the following: budgeted cost of work scheduled, budgeted cost of work performed, actual cost of work performed, schedule variance, cost variance, cost performance index, and schedule performance index.

i. Explain what is meant by the term "baseline" as it relates to project management.

j. Discuss the use of strategic planning, and how such planning relates to ongoing operations and safety of operations.

k. Demonstrate an understanding of the project risks associated with waste disposal pathways.

l. Discuss anticipated hazards and the risks and potential impacts on scope, costs, schedule, the environment, and worker safety and performance.

Management, Assessment, and Oversight

29. D&D personnel shall demonstrate working level knowledge of project communications.

Supporting Knowledge and/or Skills

a. Describe the relationship between the DOE Project Manager, the regulatory oversight Agency(ies), and the D&D contractor, and describe the roles and responsibilities for each.

b. Identify the types of information exchanged between project team members, and provide examples of formal and informal communications.

c. Describe the types of information typically documented during execution of a D&D project.

d. Describe the team make-up (Subject Matter Experts and support) and expertise to consider when establishing a DOE D&D Team and participate on such a team.

e. Discuss methods for establishing and maintaining successful communications with

internal and external stakeholders. Describe several methods for identifying interested stakeholders.

30. D&D personnel shall demonstrate a working level knowledge of the typical limits, terms, conditions, and practices associated with D&D contracting.

Supporting Knowledge and/or Skills

a. For the following contracting methods, 1) discuss the advantages and disadvantages of each, 2) describe the role of the CO, COR, and DOE Project Manager, and 3) describe typical terms and conditions for assigning damages.

- Cost plus fee
- Fixed price
- Incentive
- Assets for Value.

b. Define "government furnished services/items" (GFSI) and how it can impact a D&D baseline.

c. Discuss the importance of formal change control with regard to project management.

d. Describe the process used to effect a change order to an existing fixed priced contract and to a cost plus fee contract.

e. Discuss the scheduling requirements (time required) to initiate a new contract for a D&D project, and its impact to a project deliverable.

31. D&D personnel shall demonstrate familiarity level knowledge of configuration management principles required to meet the project's technical and operational requirements.

Supporting Knowledge and/or Skills

a. Using the guidance in DOE-STD-1073-93, Guide for Operational Configuration Management Program, discuss the System Engineer concept as it applies to oversight of safety systems. Specifically address the areas of configuration management, assessment of system status and performance, and the technical support for operation and maintenance activities or for Documented Safety Analysis reviews.

b. Discuss the objectives of configuration management.

c. Describe the following elements of configuration management:

- Configuration identification
- Configuration control
- Configuration recording and reporting
- Waivers and deviations.

d. Discuss the revision process for technical baselines over the life of a project, including an explanation of the following:

- Functional requirements baseline

- Technical requirements baseline
- Ensuring the configuration management and baseline change control processes are integrated.

32. D&D personnel shall demonstrate a familiarity level knowledge of the requirements for downgrading security requirements as a facility proceeds through the disposition process.

- **DOE Order 470.1, Safeguards and Security Program**
- **DOE Policy 470.1, Integrated Safeguards and Security Management (ISSM) Policy**
- **DOE Manual 474.1-1A, Manual for Control and Accountability of Nuclear Materials.**

Supporting Knowledge and/or Skills

a. Describe the process to reduce security controls such as from a Material Access Area to a Limited Area to a Property Protection Area.

33. D&D personnel shall demonstrate working level knowledge of DOE Order 414.1A, Quality Assurance.

Supporting Knowledge and/or Skills

a. Discuss the purpose, scope, and application of the listed Order, policies, and circulars. Include in this discussion key terms, essential elements, and personnel responsibilities and authorities.

b. Demonstrate an understanding of quality assurance/quality control as it relates to a D&D project. Discuss applied use of analytical data, project peer reviews, management walkthroughs, and self-assessments.

c. Outline the elements necessary to ensure that the contractor has successfully implemented a self-assessment program that addresses core safety, environmental, and health issues of concern.

d. Outline the value of peer reviews of projects with the contractor team and the oversight team.

e. Explain the methodologies for cost and error trending, and root cause analysis.

34. D&D personnel shall demonstrate a working level knowledge of problem analysis principles and techniques necessary to identify problems, determine potential causes of the problems, and identify corrective actions(s).

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 and explain the application of the following Root Cause Analysis processes in

the performance of occurrence investigations:

- Events and Causal Factors Charting
- Root Cause Coding
- Recommendation Generation.

c. Compare and contrast Type A and Type B accident investigations and discuss an example of the application of each or participate on a Type A or Type B accident investigation team.

d. Explain the necessity for and differences between the immediate, short term, and long-term actions taken as the result of a problem identification or occurrence.

e. Explain and apply problem analysis techniques to the identification of potential problems and/or the prevention of problems. Include data gathering techniques and the use of trending/history in your explanation.

f. Participate in or observe a problem analysis and critique the results.

APPENDIX A
CONTINUING EDUCATION, TRAINING AND PROFICIENCY PROGRAM

The following list represents suggested continuing education, training and other opportunities that are available for DOE personnel after completion of the competency requirements in this technical Functional Area 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. The list of suggested activities was developed by the Subject Matter Experts involved in the development of the Functional Area Qualification Standard and is not all-inclusive.

LIST OF CONTINUING EDUCATION, TRAINING AND OTHER ACTIVITIES

Deactivation and decommissioning personnel shall participate in an Office/Facility-specific continuing training and qualification program that includes the following elements:

1. Continuing technical education and/or training covering topics directly related to the duties and responsibilities of deactivation and decommissioning personnel 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. Actively perform the duties of a deactivation and decommissioning specialist at a Department of Energy facility a minimum of 40 hours per calendar quarter.

3. Specific continuing training requirements shall be documented in Individual Development Plans.

CONCLUDING MATERIAL

Review Activity:
EM
NNSA
EH
NE
SC

Preparing Activity:
DOE-EM-3

Project Number:
TRNG-0025

Field and Operations Offices
CBFO
CH
ID
OH
OR
ORP
RFFO
RL
SRO

Area and Site Offices
Argonne Area Office
Brookhaven Area Office
Fermi Area Office
Kansas City Site Office
Livermore Site Office
Los Alamos Site Office
Nevada Site Office
Pantex Site Office
Princeton Area Office
Sandia Site Office
Savannah River Site Office
Y-12 Site Office