

U.S. DEPARTMENT OF ENERGY

DEPARTMENT-WIDE

FUNCTIONAL AREA QUALIFICATION STANDARD

WASTE MANAGEMENT QUALIFICATION STANDARD COMPETENCIES

Defense Nuclear Facilities Technical Personnel

May 1995

1. GENERAL TECHNICAL

NOTE: When Department of Energy directives are referenced in the qualification standard, the most recent revision should be used.

1.1 Waste management personnel shall demonstrate a familiarity level knowledge of chemistry principles related to waste management.

Supporting Knowledge and/or Skills

- a. Discuss the hazards associated with the use of corrosives (acids and alkalies).
- b. Describe the general safety precautions necessary for the handling, storage, and disposal of corrosives.
- c. Discuss the general safety precautions regarding toxic compounds.
- d. Describe the criteria used to determine if a compound is a health hazard and discuss the methods by which toxic compounds may enter the body.
- e. Explain the difference between a flammable material and a combustible material.
- f. Describe the general safety precautions regarding the use, handling, and storage of flammable and combustible materials.
- g. Describe the four possible states of matter.
- h. Discuss the following types of chemical bonds:
 - Ionic
 - Covalent
 - Metallic

i. Explain each of the following as they relate to the basic laws of chemical reactions:

- The Law of Conservation of Mass
- The Law of Definite Proportions
- The Law of Multiple Proportions

j. Discuss how elements combine to form chemical compounds.

k. Discuss the following terms:

- Mixture
- Solvent
- Solubility
- Solute
- Solution
- Equilibrium

l. With regard to chemical reactions, state Le Chatelier's principle.

m. Discuss the following terms:

- Density
- Molarity
- Parts per million (ppm)

n. Define the following terms:

- Acid
- Base
- pOH
- Salt
- pH
- Reactives

o. Explain the process of general corrosion of iron and steel when exposed to water.

p. Discuss the two conditions that can cause galvanic corrosion.

q. Identify and discuss the special precautions necessary when handling, storing, transporting, or disposing of reactives.

r. Given examples of specific chemicals, describe their compatibility and the potential safety hazards associated with mixing them.

1.2 Waste management personnel shall demonstrate a familiarity level knowledge of thermodynamic principles related to waste management.

Supporting Knowledge and/or Skills

a. Define the following terms:

- Specific volume
- Density
- Specific gravity
- Mass
- Weight

b. Describe the thermodynamic properties of temperature and pressure.

d. Describe the relationship between absolute pressure, gauge pressure, and vacuum.

e. Define the following and describe their relationship:

- Energy
- Potential Energy
- Kinetic Energy
- Work
- Heat

f. Describe the following types of thermodynamic systems:

- Isolated system
- Open system
- Closed system

g. Describe the following terms concerning thermodynamic processes:

- Thermodynamic process
- Cyclic process
- Reversible process
- Irreversible process
- Adiabatic process
- Isentropic process
- Throttling process
- Polytropic process

h. Discuss the First Law of Thermodynamics.

i. Discuss the Second Law of Thermodynamics.

j. Using the ideal gas law, discuss the relationship between pressure, temperature, and volume.

k. Describe when a fluid may be considered to be incompressible.

l. Describe the effects of pressure and temperature changes on confined fluids.

m. Describe the difference between heat and temperature, and heat and work.

n. Describe the three modes of heat transfer.

o. Describe how the density of a fluid varies with temperature.

- p. Describe the relationship between the pressure in a fluid column and the density and depth of the fluid.
- q. Define the terms mass flow rate and volumetric flow rate.
- r. Define the property of viscosity.

1.3 Waste management personnel shall demonstrate a working level knowledge of nuclear risk management and hazard assessment required to ensure the safety of waste management operations as described in Department of Energy (DOE) Order 5480.22, Technical Safety Requirements, and Department of Energy (DOE) Order 5480.23, Nuclear Safety Analysis Reports.

Supporting Knowledge and/or Skills

- a. Define and compare the terms "risk" and "hazard."
- b. Discuss the factors that can affect risk.
- c. Explain and compare the terms Design Basis and Authorization Basis.
- d. Discuss the relationship between a Safety Analysis Report and Technical Safety Requirements.
- e. Discuss those conditions that can lead to determination of an Inadequate Safety Analysis.
- f. Given an Inadequate Safety Analysis, determine the necessary corrective actions.
- g. Describe the following types of documents and how they relate to nuclear risk management and hazard assessment:
- Safety Analysis Reports
 - Technical Safety Requirements
 - Inadequate Safety Analysis
- h. Given a list of industrial safety risks and hazards, identify and describe typical methods for ensuring that the appropriate analysis and controls are implemented to ensure worker safety.
- i. Discuss how proper risk and hazard management helps to ensure public and environmental protection.
- j. Describe the risks associated with radioactive and hazardous wastes and the improper handling of that waste.

1.4 Waste management personnel shall demonstrate a familiarity level knowledge of the management of High-Level Waste and/or other materials which, because of their highly radioactive nature, require similar handling as described in DOE Order 5820.2A, Radioactive Waste Management.

Supporting Knowledge and/or Skills

- a. Define the term "high-level waste," and list at least three potential sources of high-level waste from operations within the Complex.
- b. Discuss the Department's policy regarding the handling and management of high-level waste as described in DOE Order 5820.2, Radioactive Waste Management.

c. Discuss the basic design requirements for high-level waste for new and existing Department facilities.

d. Using DOE Order 5820.2, Radioactive Waste Management, as a reference, list and discuss the waste characterization requirements for doubly contained storage systems.

e. Using DOE Order 5820.2, Radioactive Waste Management, as a reference, discuss the storage and transfer operations for doubly contained high-level waste systems to include:

- The radioactivity concentration limit for liquid waste beyond which transfer pipes must be doubly contained.
- The conditions under which leaking waste storage systems can be used to receive waste.
- The requirements for secondary containment systems.
- The requirements for containment system ventilation systems.
- The requirements for cathodic protection engineering support features.
- Nuclear criticality safety considerations.
- The requirements for monitoring, surveillance, and leak detection.
- The contingency actions to be taken in the event of a leak or spill to the surrounding soil or other external environment.
- The spare storage capacity requirements for emergency situations.
- The requirements for waste treatment and minimization.

f. Using DOE Order 5820.2, Radioactive Waste Management, as a reference, compare and contrast the storage and transfer operations for singly contained high-level waste systems and those for doubly contained systems.

g. Using DOE Order 5820.2, Radioactive Waste Management, as a reference, describe the high-level waste disposal requirements to include:

- New and readily retrievable waste.
- Non-readily retrievable waste.

1.5 Waste management personnel shall demonstrate a familiarity level knowledge of the management of transuranic waste as described in Department of Energy (DOE) Order 5820.2A, Radioactive Waste Management.

Supporting Knowledge and/or Skills

a. Define the term "transuranic waste" (TRU) including the requirements for classification of transuranic waste and the lower concentration limit below which transuranic waste may be considered low-level waste.

b. Define the term "transuranic nuclide."

c. Using DOE Order 5820.2, Radioactive Waste Management, as a reference, discuss the Department's policy regarding the generation, transfer, storage, and disposal of transuranic waste.

d. State at least three Department operations that may potentially generate transuranic waste.

e. Discuss the basic requirements for transuranic waste certification as contained in DOE Order 5820.2, Radioactive Waste Management.

f. Discuss the requirements for temporary storage of transuranic waste at generating sites.

g. Describe the basics of the interim storage requirements for transuranic waste as contained in DOE Order 5820.2, Radioactive Waste Management.

1.6 Waste management personnel shall demonstrate a familiarity level knowledge of the management of low-level radioactive waste as described in Department of Energy (DOE) Order 5820.2A, Radioactive Waste Management.

Supporting Knowledge and/or Skills

a. Define the term "low-level waste."

b. Discuss the Department's policy regarding the handling and management of low-level waste as described in DOE Order 5820.2, Radioactive Waste Management.

c. Discuss the Department's Performance Objectives and Performance Assessment requirements as outlined in DOE Order 5820.2, Radioactive Waste Management.

d. Describe the Department's policies on low-level waste generation to include:

- Low-Level Waste generation reduction.
- Low-Level Waste segregation.
- Low-Level Waste minimization.

e. Using DOE Order 5820.2, Radioactive Waste Management, as a reference, discuss the low-level waste characterization requirements.

f. Using DOE Order 5820.2, Radioactive Waste Management, as a reference, describe the Department's low-level radioactive waste disposal site's waste acceptance criteria. Specifically state or list the issues to be addressed in the acceptance criteria for storage, treatment, or disposal facilities.

g. Using DOE Order 5820.2, Radioactive Waste Management, and other applicable documents as a reference, generally discuss the Department's policy regarding the treatment of low-level waste including waste minimization and/or volume reduction.

h. Using DOE Order 5820.2, Radioactive Waste Management, and other applicable documents as references, discuss the Department's policy regarding the disposal of low-level waste to include:

- The methods of disposal.
- Applicable engineered modifications (e.g., stabilization, packaging, burial depth, barriers) for specific waste types and compositions.
- The purpose of the Oversight and Peer Review Panel.
- The disposition of low-level waste designated as "greater than Class C."
- Disposal requirements that are intended to improve the stability of either the waste or the disposal site.
- A general discussion of the criteria for disposal site selection.
- A general discussion of the disposal facility operations

i. Discuss the basic requirements for a low-level disposal site closure and for post closure operations.

j. Using DOE Order 5484.1, Environmental Protection, Safety, and Health Protection Information Reporting Requirements, and DOE Order 5820.2, Radioactive Waste Management, as references, discuss the

environmental monitoring requirements for low-level waste treatment, storage, and disposal facilities.

1.7 Waste management personnel shall demonstrate a working level knowledge of Department of Energy (DOE) Order 5480.21, Unreviewed Safety Questions (USQs), to ensure program priorities are established, formal process requirements are met, and resources applied to ensure safety of waste management operations.

Supporting Knowledge and/or Skills

- a. Using DOE Order 5480.21, Unreviewed Safety Questions as a reference, discuss the purpose of the Order and the roles and responsibilities of waste management personnel for Unreviewed Safety Questions.
- b. State the conditions that require an Unreviewed Safety Question Safety Evaluation.
- c. Describe the process for conducting an Unreviewed Safety Question Safety Evaluation.
- d. Discuss the following terms as they apply to Unreviewed Safety Questions:
 - Categorical Exclusions
 - Prior Unreviewed Safety Question Safety Evaluations
 - Inconsequential Changes
- e. List and explain the seven criteria utilized in an Unreviewed Safety Question Safety Evaluation.
- f. Given a situation relating to Unreviewed Safety Questions, determine if an Unreviewed Safety Question exists and discuss any subsequent actions required.
- g. Identify who must approve changes involving an Unreviewed Safety Question.
- h. Given five incident reports that deal with Unreviewed Safety Questions, discuss the appropriateness of the corrective actions and identify any actions that were omitted.
- i. Identify the documentation, records, and reporting requirements necessary for proper Unreviewed Safety Question management.

1.8 Waste management personnel shall demonstrate a working knowledge level of the packaging and transportation of waste as described in:

- DOE Order 5480.3, Safety Requirements for the Packaging and Transportation of Hazardous Materials, Hazardous Substances and Hazardous Wastes
- DOE Order 1540.3A, Base Technology for Radioactive Material Transportation Packaging System

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 requirements for licensing 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 labeling, placarding, and shipping requirements specified in the requirements of 49 CFR (Placarding, Labeling, Shipping).

e. Review actual shipping manifests and report on their completeness, accuracy, and applicability.

1.9 Waste management personnel shall demonstrate a working level knowledge of mixed hazardous waste as described in Department of Energy (DOE) Order 5400.3, Hazardous and Radioactive Mixed Waste Program.

Supporting Knowledge and/or Skills

a. Define the term "mixed waste."

b. Describe the waste types that mixed waste encompasses and subdivide these categories into waste phases.

c. For each of the categories of mixed waste, provide an overview of the systems that treat, store, and dispose of these wastes.

d. Identify the Departmental facilities that comprise the waste management systems according to waste type and phase. Identify the facilities according to:

- Treatment Facilities
- Storage Facilities
- Disposal Facilities

e. Discuss, in general terms, the planning and direction of mixed waste activities for the Department including:

- Identified problems and their recommended solutions
- Strategies for making improvements
- Actions to achieve compliance with regulations
- How findings of performance assessments are incorporated into recommendations and plans.

1.10 Waste management personnel shall demonstrate a working level knowledge of hazardous waste as described in:

- Department of Energy (DOE) Order 5400.3, Hazardous and Radioactive Mixed Waste Program
- Department of Energy (DOE) Order 1540.2, Hazardous Material Packaging for Transport

Supporting Knowledge and/or Skills

a. Define the term "hazardous waste."

b. In general terms, provide an overview of the system used to treat, store, and dispose of hazardous wastes at a site.

c. Identify the kinds of hazardous wastes generated within the Department and their sources.

d. Describe the combination of facilities used to manage hazardous wastes at a site.

e. Discuss the current methods of disposing of hazardous wastes.

f. Identify recent and planned changes in waste management practices related to minimizing the generation of hazardous wastes.

2. REGULATORY

NOTE: When Department of Energy directives are referenced in the qualification standard, the most recent revision should be used.

2.1 Waste management personnel shall demonstrate a working level knowledge of 29 CFR 1910.96, Ionizing Radiation, 29 CFR 1910.97, Non-Ionizing Radiation and Department of Energy (DOE) Order 5480.11, Radiation Protection for Occupational Workers.

Supporting Knowledge and/or Skills

a. Compare and contrast the dose equivalencies between a rem and other dose units.

b. Given appropriate data, classify an area as either a "restricted area" or an "unrestricted area" and state the reasons for the classification.

c. Discuss the requirements related to the exposure of individuals to radiation in restricted areas, include any applicable dose limits.

d. Discuss the requirements related to the exposure of individuals to airborne radioactive material, include any applicable precautionary measures and personal monitoring requirements.

e. Discuss the requirements for posting the various types of radiation areas, include the requirements for exceptions to the posting requirements.

f. Discuss the requirements for exemptions for radioactive materials packaged for shipment.

g. Discuss the requirements related to notification of incidents.

h. Compare and contrast the terms "non-ionizing radiation" and "ionizing radiation."

2.2 Waste management personnel shall demonstrate a working level knowledge of Department of Energy (DOE) Order 5000.3, Occurrence Reporting and Processing of Operations Information.

Supporting Knowledge and/or Skills

a. State the purpose of DOE Order 5000.3, Occurrence Reporting and Processing of Operations Information.

b. Define the following terms:

- Event
- Condition
- Facility
- Notification Report
- Occurrence Report

- Reportable Occurrence

c. Discuss the Department's policy regarding the reporting of occurrences as outlined in DOE Order 5000.3, Occurrence Reporting and Processing of Operations Information.

d. State the different categories of reportable occurrences and discuss each.

e. Discuss the notification requirements associated with each of the categories of reportable occurrences and any associated time requirements. At a minimum, include the following in the discussion:

- Notification Report
- 10-Day Occurrence Report
- Final Report
- Closing out and verifying Occurrence Reports
- Processing Occurrence Reports which cross waste management lines of professional responsibility
- Contractor Occurrence Reporting Procedures

f. Discuss the general process for preparing and submitting occurrence reports and their follow-up.

g. Using Attachment 1 to DOE Order 5000.3, Occurrence Reporting and Processing of Operations Information, discuss the role of waste management personnel in waste management related reportable occurrences.

h. Given an occurrence report, determine the following:

- The adequacy of the review process used
- That causes were appropriately defined
- That corrective actions addressed causes
- That the lessons learned were appropriate
- That corrective actions have been completed

i. Using an occurrence report involving waste management activities, identify and discuss the factors contributing to the occurrence.

2.3 Waste management personnel shall demonstrate a working level knowledge of Department of Energy (DOE) Order 5400.1, General Environmental Protection Program.

Supporting Knowledge and/or Skills

a. State the purpose of DOE Order 5400.1, General Environmental Protection Program.

b. Define the following terms:

- Effluent
- Environmental Monitoring
- Environmental Protection Standard
- Effluent Monitoring
- Environmental Surveillance
- Environmental Occurrence
- Waste Minimization

c. Discuss the Department's policy pertaining to the environmentally safe and sound operation of its facilities.

d. Discuss the Department's policy pertaining to the minimization of waste.

e. Discuss the requirements for Notification and Reports as contained in Chapter II of DOE Order 5400.1, General Environmental Protection Program. Include the following as a minimum:

- Notification of Environmental Occurrences to EH-1
- Office of Management and Budget Circular A-106
- Annual Site Environmental Report
- Reports on Radioactive/Effluent/On-Site Discharge/Unplanned Releases

f. Discuss the requirements for Environmental Protection Program Plans as contained in Chapter III of DOE Order 5400.1, General Environmental Protection Program. Include the following as a minimum:

- Implementation Plan
- Long Range Environmental Protection Plan
- Special Program Planning Requirements

g. Discuss the requirements for Environmental Monitoring Requirements as contained in Chapter IV of DOE Order 5400.1, General Environmental Protection Program. Include the following as a minimum:

- Preoperational monitoring of facilities, sites, and operations
- Environmental monitoring plans
- Environmental monitoring - general requirements
- Meteorological monitoring program
- Radiological and non-radiological monitoring
- Groundwater monitoring program

2.4 Waste management personnel shall demonstrate a working level knowledge of Department of Energy (DOE) Order 5400.5, Radiation Protection of the Public and the Environment.

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 Order 5400.5, Radiation Protection of The Public and the Environment.

b. Define the following terms:

- As low as reasonably achievable (ALARA)
- Best available technology (BAT)
- Derived concentration guide (DCG)
- Absorbed dose
- Collective dose equivalent
- Collective effective dose equivalent
- Committed dose equivalent
- Committed effective dose equivalent
- Deep dose equivalent
- Dose equivalent

- Effective dose equivalent
- Public dose
- Weighting factor
- Quality factor
- Effluent monitoring
- Environmental surveillance
- Protective action guides
- Release of property
- Residual radioactive material
- Settleable solids
- Soil column

c. Given an "as low as reasonably achievable" plan, discuss the extent to which the minimum factors were addressed.

d. Discuss the public dose limit factors associated with all exposure modes including sources from the management and storage of spent nuclear fuel, high-level wastes, and transuranic wastes at disposal facilities.

e. Discuss the factors waste management personnel must take into consideration regarding the management and control of radioactive materials in liquid discharges and phase-out of soil columns.

f. Given treatment technology data on the discharge of liquid waste to surface waters, determine the available technologies and, given sufficient information on those technologies, determine the best available technology.

g. State the Department's position regarding the continued use of soil columns.

h. State when the best available technology application process shall be used in relation to the discharge of liquid wastes to sanitary sewerage.

i. 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 Order 5400.5, Radiation Protection of The Public and the Environment, Chapter IV, Residual Radioactive Material.

2.5 Waste management personnel shall demonstrate a familiarity level knowledge of Department of Energy (DOE) Order 6430.1, General Design Criteria.

Supporting Knowledge and/or Skills

a. State the purpose of DOE Order 6340.1, General Design Criteria, and discuss the general policy and objectives of the Department for the acquisition of facilities for its use.

b. Using DOE Order 6430.1, General Design Criteria, as a reference, discuss in general terms the Special Facilities requirements as they pertain to waste management.

2.6 Waste management personnel shall demonstrate a familiarity level knowledge of Department of Energy (DOE) Technical Standard DOE-STD-1027, Nuclear Facility Organization/Classification.

Supporting Knowledge and/or Skills

- a. Using DOE-STD-1027, Nuclear Facility Organization/Classification, as a reference, discuss its purpose, applicability, and scope.
- b. State the three levels of facility radiological hazard classification.
- c. Given several facility data sets, determine each facility's requirements for a facility Safety Analysis Report using Figure 3.1 and Table A.1 in DOE-STD-1027, Nuclear Facility Organization/Classification, and DOE Order 5480.23, Nuclear Safety Analysis Reports.

2.7 Waste management personnel shall demonstrate a working level knowledge of 29 CFR 1910.119, Process Safety Management of Highly Hazardous Chemicals.

Supporting Knowledge and/or Skills

- a. State the purpose and applicability of 29 CFR 1910.119.
- b. As contained in 29 CFR 1910.119, describe the role Departmental waste management personnel play in:
 - The development and review of a contractor's operating procedures
 - The evaluation of a contractor's training program
 - Compliance audit requirements
- c. Discuss a contractor's responsibilities to the Department regarding the operation of facilities containing highly hazardous chemicals.
- d. List the safety and health considerations associated with hazardous chemicals as outlined in 29 CFR 1910.119.
- e. Discuss the non-mandatory Compliance Guidelines and Recommendations for Process Safety Management contained in 29 CFR 1910.119.

2.8 Waste management personnel shall demonstrate a familiarity level knowledge of 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response.

Supporting Knowledge and/or Skills

- a. State the purpose and applicability of 29 CFR 1910.120.
- b. Compare and contrast the respective roles of a contractor's operations organization and Department waste management personnel as outlined in

29 CFR 1910.120.
- c. Define the terms "emergency response" or "responding to emergencies" as they relate to waste management.

2.9 Waste management personnel shall demonstrate a familiarity level knowledge of the Federal Facility Compliance Act (FFCA).

Supporting Knowledge and/or Skills

a. Discuss how the Federal Facility Compliance Act applies to and impacts Department waste management programs.

b. Identify the requirements contained in the Federal Facility Compliance Act, including the requirements for a national inventory of Departmental mixed waste, a report containing treatment capabilities and site-specific plans for development of treatment capacities and technologies.

2.10 Waste management personnel shall demonstrate a familiarity level knowledge of Inter-Agency Agreements (IAG) and Agreements in Principle (AIPs).

Supporting Knowledge and/or Skills

a. Discuss how Inter-Agency Agreements and Agreements in Principle apply to and impact Department waste management programs.

b. Describe how Inter-Agency Agreements and Agreements in Principle are developed and entered into by the Department.

2.11 Waste management personnel shall demonstrate a familiarity level knowledge of Department Consent and Compliance Orders (CCOs) that are applicable to waste management programs.

Supporting Knowledge and/or Skills

a. Describe Consent and Compliance Orders and discuss how they apply to and impact Department waste management programs.

b. Given a list of Consent and Compliance Orders, identify those that are applicable to waste management programs.

c. Identify the requirements contained in Consent and Compliance Orders that form the basis of the authority for waste management personnel in the oversight and management of Department facilities.

d. Discuss how the requirements of site-specific Consent and Compliance Orders are addressed by appropriate programs.

2.12 Waste management personnel shall demonstrate a familiarity level knowledge of Department Notice of Violations (NOVs) that are applicable to waste management programs.

Supporting Knowledge and/or Skills

a. Describe Notice of Violations and discuss how they apply to and impact Department waste management programs.

b. Given a list of Notice of Violations, identify those that are applicable to waste management programs.

c. Given several Notice of Violations that are applicable to waste management programs, identify the violations, describe the corrective actions to be taken, and determine the status of implementation of the corrective actions.

2.13 Waste management personnel shall demonstrate a familiarity level knowledge of the Emergency Planning and Community Right-To-Know Act (EPCRA) and its impact on Department waste

management programs.

Supporting Knowledge and/or Skills

- a. Discuss the purpose and scope of the Emergency Planning and Community Right-To-Know Act and its applicability to Department waste management programs.
- b. Discuss how the requirements of Emergency Planning and Community Right-To-Know Act are being addressed by appropriate programs.
- c. Discuss the impact the Emergency Planning and Community Right-To-Know Act has on waste management personnel in the performance of their duties and in their interaction with external stakeholders.

2.14 Waste management personnel shall demonstrate a familiarity level knowledge of the Pollution Prevention Act of 1990 (PPA).

Supporting Knowledge and/or Skills

- a. Discuss how the Pollution Prevention Act applies to and impacts Department waste management programs.
- b. Identify the requirements contained in the Pollution Prevention Act that apply to waste management.

2.15 Waste management personnel shall demonstrate a familiarity level knowledge of the Clean Water Act (CWA).

Supporting Knowledge and/or Skills

- a. Discuss how the Clean Water Act applies to and impacts Department waste management programs.
- b. Identify the requirements in the Clean Water Act that apply to waste management.

2.16 Waste management personnel shall demonstrate a familiarity level knowledge of the Clean Air Act (CAA).

Supporting Knowledge and/or Skills

- a. Discuss how the Clean Air Act applies to and impacts Department waste management programs.
- b. Identify the requirements in the Clean Air Act that apply to waste management.

2.17 Waste management personnel shall demonstrate a familiarity level knowledge of the Safe Drinking Water Act (SDWA).

Supporting Knowledge and/or Skills

- a. Discuss how the Safe Drinking Water Act applies to and impacts Department waste management programs.
- b. Identify the requirements in the Safe Drinking Water Act that apply to waste management.

2.18 Waste management personnel shall demonstrate a familiarity level knowledge of the Superfund Amendment Reauthorization Act (SARA).

Supporting Knowledge and/or Skills

- a. Discuss how the Superfund Amendment Reauthorization Act applies to and impacts Department waste management programs.
- b. Identify the requirements in the Superfund Amendment Reauthorization Act that apply to waste management.

2.19 Waste management personnel shall demonstrate a familiarity level knowledge of the National Pollution Discharge Elimination System (NPDES).

Supporting Knowledge and/or Skills

- a. Discuss how the National Pollution Discharge Elimination System applies to and impacts Department waste management programs.
- b. Identify the requirements in the National Pollution Discharge Elimination System that apply to waste management.

2.20 Waste management personnel shall demonstrate a familiarity level knowledge of environmental policy as described in:

- The National Environmental Policy Act (NEPA)
- 40 CFR 1500, Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act
- Department of Energy (DOE) Order 5440.1E, National Environmental Policy Act Compliance Program

Supporting Knowledge and/or Skills

- a. Discuss how the National Environmental Policy Act applies to and impacts Department waste management programs.
- b. Identify the requirements contained in the National Environmental Policy Act that form the basis of authority for waste management personnel in the oversight and management of Department facilities.

2.21 Waste management personnel shall demonstrate a familiarity level knowledge of the Occupational Safety and Health Act (OSHA).

Supporting Knowledge and/or Skills

- a. Discuss how the Occupational Safety and Health Act applies to and impacts Department waste management programs.
- b. Identify the requirements contained in the Occupational Safety and Health Act that form the basis of authority for waste management personnel in the oversight and management of Department facilities.

2.22 Waste management personnel shall demonstrate a familiarity level knowledge of Executive

Order 12856 titled Environmental Protection Act and Executive Order 12893 titled Federal Acquisition, Recycling, and Waste Prevention.

Supporting Knowledge and/or Skills

- a. Compare and contrast an Executive Order and legislation (e.g., National Environmental Protection Act, Clean Water Act, Clean Air Act).
- b. Discuss how waste management-related Executive Orders apply to and impact Department of Energy waste management programs.
- c. Identify the requirements contained in waste management-related Executive Orders that form the basis of the authority for waste management personnel in the oversight and management of Department facilities.

2.23 Waste management personnel shall demonstrate a working level knowledge of the Resource Conservation and Recovery Act (RCRA).

Supporting Knowledge and/or Skills

- a. Discuss the general requirements of Resource Conservation and Recovery Act as it applies to hazardous and mixed waste, as defined in 40 CFR 260.
- b. Discuss the framework for determining whether or not a waste is hazardous, as required by 40 CFR 261.
- c. Describe the four possible characteristics of hazardous waste and the listings of hazardous waste, and discuss the differences between characteristic and listed waste.
- d. Discuss regulatory requirements imposed on generators of hazardous wastes required by 40 CFR 262 related to the following:
 - Accumulating waste
 - Preparing hazardous waste for shipment
 - Preparing a uniform hazardous waste manifest
- e. For Resource Conservation and Recovery Act permitted facilities and interim status facilities discuss the following as required by 40 CFR 264 and 40 CFR 265:
 - General facility standards
 - Preparedness and prevention requirements
 - Contingency plan and emergency procedures
 - Manifest and record keeping requirements
 - Releases from solid waste management units
 - Closure requirements
 - Use and management of containers
 - Tank systems
 - Landfills
- f. Discuss the Resource Conservation and Recovery Act regulatory requirements for:
 - Recyclable materials
 - Incinerators, and

- Disposal facilities

g. Describe the treatment standards required under the Land Disposal Restrictions, and describe the prohibition on storage as required by 40 CFR 268.

h. Discuss Resource Conservation and Recovery Act permitting requirements and requirements associated with modifying permits, as defined in 40 CFR 270.

2.24 Waste management personnel shall demonstrate a working level knowledge of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Supporting Knowledge and/or Skills

a. Discuss the general purpose of Comprehensive Environmental Response, Compensation, and Liability Act as it applies to risks to human health and the environment resulting from releases or threatened releases of hazardous substances into the environment.

b. Identify what constitutes a hazardous substance under Comprehensive Environmental Response, Compensation, and Liability Act.

c. Explain the intent of the Hazardous Substance Response Trust Fund.

d. Describe the National Oil and Hazardous Substances Pollution Contingency Plan.

e. Describe when a hazardous substance release is subject to Comprehensive Environmental Response, Compensation, and Liability Act reporting requirements.

f. Describe the objectives of the National Priorities List and Hazard Ranking System.

g. List the processes associated with the Hazardous Substance Response Process.

h. Discuss the Department's Comprehensive Environmental Response, Compensation, and Liability Act policies and procedures as established by DOE Order 5400.4, Comprehensive Environmental Response, Compensation, and Liability Act Requirements.

3. ADMINISTRATIVE

NOTE: When Department of Energy directives are referenced in the qualification standard, the most recent revision should be used.

3.1 Waste management personnel shall demonstrate a working level knowledge of communications (both oral and written) when working or interacting with the contractor, media, stakeholders, and other internal and external organizations.

Supporting Knowledge and/or Skills

a. Describe the roles and responsibilities of waste management personnel for the following:

- DOE Order 5500.4, Public Affairs Policy and planning Requirements for Emergencies
- DOE Order 1700.1, Freedom of Information Program.

- b. Identify the various internal and external groups with whom waste management personnel must interface in the performance of their duties.
- c. Describe the media that may be utilized to communicate with these groups.
- d. Using actual file footage from the Public Affairs Office, review news media event coverage and critique the interviewees' actions.
- e. Discuss proper techniques of media interaction.

4. MANAGEMENT, ASSESSMENT, AND OVERSIGHT

NOTE: When Department of Energy directives are referenced in the qualification standard, the most recent revision should be used.

4.1 Waste management personnel shall demonstrate a familiarity level knowledge of financial management practices and how contractor resources are applied to meet waste management quality, safety, cost, and schedule commitments as described in Department of Energy (DOE) Notice 4700.5, Project Control System Guidelines.

Supporting Knowledge and Skills

- a. Describe the process for preparing cost estimates and budgets.
- b. Describe and contrast direct and indirect costs. List ways to reduce indirect costs.
- c. Define and explain the relationship between the following terms:
 - Budgeted cost of work scheduled (BCWS)
 - Budgeted cost of work performed (BCWP)
 - Actual cost of work performed (ACWP)
 - Earned value (EV)
- d. Describe the types of Earned Value and how they are measured.
- e. Describe the types of data required to forecast cost and schedule performance.
- f. Define the term "Estimate at Completion."
- g. Discuss the importance of formal change control in relation to project management.
- h. Using existing program data, explain the planning and scheduling done to ensure that program requirements are achievable.
- i. Using data from two waste management related programs, discuss each program's budget and its impact on the program's compliance.

4.2 Waste management personnel shall demonstrate a working level knowledge of Department

financial management practices, as they relate to the oversight and management of waste management activities as described in Department of Energy (DOE) Notice 4700.5, Project Control System Guidelines.

Supporting Knowledge and Skills

- a. Given appropriate data, review contractor cost estimates and budgets and report on their accuracy.
- b. Given program data, identify the direct and indirect costs.
- c. Given project management data, identify the Earned Value and discuss its significance to project budget and schedule.
- d. Given project management data, identify the Budgeted Cost of Work Performed, the Budgeted Cost of Work Schedule, the Actual Cost of Work Performed, the schedule variance and calculate or verify the calculation of the cost variance.
- e. Given project management data, determine the Estimate at Completion.
- f. Given project data, prepare and submit the appropriate change control forms to document changes in the program funding.
- g. Using hypothetical program data, prepare a plan and supporting schedule to support the production of identified deliverables.

4.3. Waste management personnel shall demonstrate a working level knowledge of program management practices and how contractor resources are applied to meet waste management quality, safety, cost, and schedule commitments as described in Department of Energy (DOE) Order 4700.1, Project Management System, and the Department of Energy (DOE) Technical Standard, DOE-STD-1073-93, Guide for Operational Configuration Management.

Supporting Knowledge and/or Skills

- a. Explain the purpose of program management, and describe the life cycle of a typical project.
- b. Describe typical documents and data sources utilized in program management.
- c. Identify and explain the major elements of a project, and discuss their relationship.
- d. Explain the purpose and use of a project management plan.
- e. Discuss the role of configuration management as it relates to project management.
- f. Discuss the role of quality assurance as it relates to project management.
- g. Explain the use of safety plans in the management of projects.
- h. Discuss the relationship between work breakdown structure and cost and schedule.
- i. Describe the purpose and use of work packages and/or planning packages.

- j. Describe the purpose of schedules, and discuss the use of milestones and activities.
- k. Describe the critical path method of scheduling.
- l. Explain the concept of a project management baseline and describe the four baselines used in project management.

4.4 Waste management personnel shall demonstrate working level knowledge of program plans submitted by contractors, including the evaluation of the scope and technical merit of those plans as described in Department of Energy (DOE) Order 4700.1, Project Management System, and the Department of Energy (DOE) Technical Standard, DOE-STD-1073-93, Guide for Operational Configuration Management.

Supporting Knowledge and Skills

- a. Given appropriate data, review a Project Management Plan and report on its accuracy, as it relates to actual data.
- b. Given program data, review a Work Breakdown Structure and report on its accuracy, as it relates to actual data.
- c. Given data, identify a project's critical path schedule.

4.5 Waste management personnel shall demonstrate a working level knowledge of the Department of Energy/facility contract provisions necessary to provide oversight of a contractor's operations as described in Department of Energy (DOE) Order 4700.1, Project Management System, and Department of Energy (DOE) Technical Standard, DOE-STD-1073-93, Guide for Operational Configuration Management.

Supporting Knowledge and/or Skills

- a. Describe the role of waste management personnel role in contractor oversight.
- b. Compare and contrast the following:
 - The Department of Energy's expectations of a Management and Operating (M&O) contractor;
 - Management and Operating contractors' expectations of the Department of Energy.
- c. Identify the key elements and features of an effective Department of Energy and Management and Operating contractor relationship.
- d. Describe the responsibility waste management personnel have in association with contractor compliance under the Price-Anderson Amendments Act.
- e. Describe the role of waste management personnel in evaluating the performance of the contractor.
- f. Explain the responsibilities waste management personnel have associated with the most recent revision of DOE Order 5480.29, Employee Concerns, with respect to the identification, reporting, reviewing, and documentation of employee concerns.

4.6 Waste management personnel shall demonstrate a working level knowledge of waste streams by

assessing technologies for their treatment, storage, and disposal (TSD).

Supporting Knowledge and/or Skills

- a. Given waste management related project data, identify the lessons to be learned during the incorporation of waste minimization initiatives across the Complex.
- b. Using the categories and classes of Department defined waste, describe the general engineering approaches to the various categories and classes must be handled.
- c. Apply the treatment requirements of 40 CFR 266, Land Disposal Restrictions to the assessment of treatment technologies.
- d. Discuss the interim status treatment, storage, and disposal requirements as outlined in 40 CFR 265, Interim Status TSD Requirements.
- e. Assess two technologies for the treatment, storage, and/or disposal of waste and report their applicability to the Department.

4.7 Waste management personnel shall demonstrate a working level knowledge of assessment techniques, reporting, and follow-up actions as they apply to contractor performance.

Supporting Knowledge and/or Skills

- a. Describe the role waste management personnel have with respect to performance oversight of Government-Owned, Contractor-Operated (GOCO) facilities.
- b. Describe the assessment requirements and limitations associated with the interface waste management personnel have with contractor employees.
- c. Describe how planning, observations, interviews, and document research are used during an assessment.
- d. Explain the essential elements of a performance-based assessment including the areas of investigation, fact-finding, and reporting. Include a discussion of the essential elements and processes associated with the following assessment activities:
 - Exit interviews
 - Closure process
 - Tracking to closure
 - Follow-up
 - Contractor corrective action implementation
- e. Describe the actions to be taken if the contractor challenges the assessment findings and explain how such challenges can be avoided.

4.8 Waste management personnel shall demonstrate the ability to independently assess contractor and/or Federal employee waste management activities and make all necessary reports.

Supporting Knowledge and/or Skills

- a. Given different sets of performance data, compare and contrast the data to highlight acceptable and

unacceptable work performances.

b. Describe the methods by which noncompliance is determined and communicated to contractor and Department management.

c. Conduct two assessments of a contractor's activities involving waste management, then develop and submit the resulting assessment reports.

d. Perform an independent assessment of three different contractor operations.

e. Using the findings from an assessment, develop an assessment report.

4.9 Waste management personnel shall demonstrate a working level knowledge of problem analysis principles and the techniques necessary to identify problems, determine potential causes of problems, and identify corrective action(s) as described in Department of Energy (DOE) Order 4010.1, Value Engineering, and OMB Circular A-131.

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
- Management oversight risk tree analysis

b. Describe and explain the application of the following root cause analysis processes in the performance of occurrence investigations:

- Event and Causal Factors Charting;
- Root Cause Coding;
- Recommendation Generation.

c. Describe the following types of investigations and discuss an example of the application of each:

- Type A
- Type B
- Type C

d. Compare and contrast immediate, short term, and long term actions taken as the result of a problem identification, or an occurrence.

e. Given event and/or occurrence data, apply problem analysis techniques and identify the problems and how they might have been avoided.

f. Describe various data gathering techniques and the use of trending/history when analyzing problems.

4.10 Waste management personnel shall demonstrate a working level knowledge of stakeholder participation requirements (as described in Public Law 92-463), communication techniques and the Freedom of Information Act.

Supporting Knowledge and/or Skills

- a. Discuss the roles and responsibilities of site and/or community advisory boards on waste management issues as described in Public Law 92-463, October 6, 1972, Federal Advisory Committee Act, and subsequent amendments.
- b. Given data, discuss the Department of Energy's official position on three waste management issues that impact one or more of the above segments (Federal, State, local, Indian Tribes, and public stakeholders).
- c. Discuss the Freedom of Information Act (FOIA) and its impact on Department waste management programs. State all security precautions to be taken with regard to appropriate programs and the Freedom of Information Act.
- d. Given waste management-related program data, identify those portions of the data which are required to be communicated to organizations external to Department waste management, and discuss any potential impacts on Department programs.
- e. Using a simulated scenario, describe the appropriate communications with Headquarters Program Office representatives, Department legal representatives, contractors, and State, local, and Indian Tribe officials.
- f. Given actual reports from the Defense Nuclear Facilities Safety Board, the Government Accounting Office, Tiger Teams, or any other entity external to waste management, report on the applicability of these reports and any resulting implementation plans to Department waste management programs.

EVALUATION REQUIREMENTS

The following requirements shall be met to complete the Department-wide Waste Management Functional Area Qualification Standard. The evaluation process identified below serves as a measurement tool for assessing whether the participants have acquired the technical competencies outlined in this Standard.

1. Documented completion of the Department-wide General Technical Base Qualification Standard in accordance with the requirements contained in that Standard.
2. Documented completion of the competency requirements listed in this functional area qualification standard. Documentation of the successful completion of these competency requirements may be satisfied by a qualifying official using any of the following methods:
 - Documented evaluation of equivalencies
 - Written examination
 - Documented oral evaluation
 - Documented observation of performance

CONTINUING TRAINING AND PROFICIENCY REQUIREMENTS

Waste management technical personnel shall participate in an Office/facility/position-specific continuing training and qualification program that includes the following elements:

1. Technical education and/or training covering topics directly related to the duties and responsibilities of waste management technical personnel as determined by line management. This may include courses and/or training provided by:
 - Department of Energy

- Other Government agencies
- Outside vendors
- Educational institutions

2. Training covering topics that address identified deficiencies in the knowledge and/or skills of waste management technical personnel.

3. Training in areas added to the Waste Management Functional Area Qualification Standard since initial qualification.

4. Specific continuing training requirements shall be documented in Individual Development Plans (IDPs).