

U.S. DEPARTMENT OF ENERGY
DEPARTMENT-WIDE
FUNCTIONAL AREA QUALIFICATION STANDARD

WASTE MANAGEMENT QUALIFICATION STANDARD

Defense Nuclear Facilities Technical Personnel

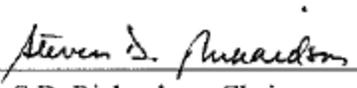


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APPROVAL

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.



S.D. Richardson, Chair
Federal Technical Capability Panel

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U.S. DEPARTMENT OF ENERGY FUNCTIONAL AREA QUALIFICATION STANDARD

FUNCTIONAL AREA

Waste Management

PURPOSE

The Department's Federal Technical Capability Program Policy, issued by the Secretary in December 1998, commits the Department to continuously strive for technical excellence. The Technical Qualification Program, along with the supporting technical Functional Area 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 Functional Area Qualification Standards should be aligned with and integrated into the recruitment and staffing processes for technical positions. The technical Functional Area Qualification Standards should form, in part, 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 qualification standards will be greatly enhanced by application of appropriate materials from the technical Functional Area Qualification Standards.

The technical Functional Area Qualification Standards are not intended to replace the U.S. Office of Personnel Management's (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 Waste Management Functional Area Qualification Standard establishes common functional area competency requirements for Department personnel who provide assistance, direction, guidance, oversight, or evaluation of contractor technical activities impacting the safe operation of 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. Program and Field offices may choose to use this technical Functional Area Qualification Standard as-is, or they may use parts of it to facilitate the development of their own unique Technical Qualification Standards. In either case, satisfactory and documented attainment of the competency requirements contained in this technical Functional Area Qualification Standard, or similar Standards, ensures waste management 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 technical competency requirements for waste management personnel. Although there are other competency requirements associated with the positions held by waste management 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 supporting knowledge and/or skill statements are not requirements and do not necessarily have to be fulfilled to meet the intent of the competency.**

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 waste management personnel possess the competencies required of their position. That includes the competencies identified in this technical Functional Area Qualification Standard or a similar Standard developed by the organization. Documentation of the completion of the requirements of the Standard shall be included in the employee's training and qualification record.

Equivalencies may be granted for individual competencies based upon an objective evaluation of the employee's prior education, experience, and/or training. Equivalencies shall be granted in accordance with the policies and procedures of the program or field office. 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. 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 courses 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 or the immediate supervisor environmental compliance personnel using any of the following methods:

- Documented evaluation of equivalencies
- Written examination
- Documented oral evaluation
- Documented observation of performance

DUTIES AND RESPONSIBILITIES

The following are the typical duties and responsibilities expected of defense nuclear facility technical personnel assigned to the Waste Management Functional Area:

1. Develops, implements, and evaluates waste management strategic, baseline, project, and program plans.
2. Maintains communication with Headquarters, field elements, regulatory agencies, the public and other stakeholders.
3. Develops, reviews and implements waste management policy, requirements and guidance.
4. Evaluates waste management programs to determine whether the program complies with applicable codes, standards and guides, regulations, Orders and accepted practices.
5. Appraises facilities, procedures, and operations to determine their adequacy to protect the worker and members of the general public.
6. Administers and coordinates waste management programs for the Department, including performing independent evaluations and special studies.
7. Provides technical assistance and advice in the area of waste management to other organizations and independent review groups.
8. Reviews Office and/or contractor performance to identify trends indicative of performance or compliance status.

9. Performs technical reviews and provides recommendations on Waste Management Program documents (plans, schedules, etc).
10. Reviews and comments on a wide variety of operating contractor documents such as authorization basis documents.
11. Evaluates, oversees, and provides emergency preparedness and emergency response support related to waste management incidents in conjunction with contractor, Federal, State and local officials, as required.

Position-specific duties and responsibilities for waste management 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 waste management personnel is:

1. Education:

Bachelor of Science degree in engineering or physical science from an accredited institution or meet the alternative requirements specified in the Qualification Standards Handbook for the GS-1300, Physical Scientist and Health Physics Series; GS-800, General Engineer series; and the GS-400, Biological Sciences series.

2. Experience:

Industry, facility, operations, other Federal related experience that has demonstrated background in waste, environmental or project management.

REQUIRED TECHNICAL COMPETENCIES

Each of the competency statements defines the level of expected knowledge and/or skill that an individual must possess to meet the intent of this Technical Qualification Standard. **The supporting knowledge and/or skill statements further describe the intent of the competency statements but are not requirements.**

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

SCIENTIFIC AND ENGINEERING PRINCIPLES

Chemistry

1. **Waste management personnel shall demonstrate a familiarity level knowledge of chemistry fundamentals.**

Supporting Knowledge and/or Skills

- a. Discuss the following types of chemical bonds:
 - Ionic
 - Covalent
 - Metallic
- b. Discuss how elements combine to form chemical compounds.
- c. Define and discuss the following terms:
 - Mixture
 - Solvent
 - Solubility
 - Solute
 - Solution
 - Equilibrium
 - Density
 - Molarity
 - Parts per million (ppm)
 - Acid
 - Base
 - pOH
 - Salt
 - pH

2. **Waste management personnel shall demonstrate a familiarity level knowledge of chemistry fundamentals in the areas of corrosion and water treatment.**

Supporting Knowledge and/or Skills

- a. Explain the process of general corrosion of iron and steel when exposed to water.
- b. Discuss the two conditions that can cause galvanic corrosion.
- c. Discuss the following types of specialized corrosion:
 - Pitting corrosion
 - Stress corrosion cracking
 - Crevice corrosion
- d. Explain the following water treatment processes.
 - Ion exchange
 - pH adjustment
 - Clarification
 - Solids handling
 - Disinfection techniques
 - Enhanced evaporation
 - Reverse osmosis
 - Electrodialysis
 - Carbon adsorption
 - Precipitation
 - Flocculation

Statistics

3. Waste management personnel shall demonstrate a familiarity level knowledge of probability and simple statistics.

Supporting Knowledge and/or Skills

- a. State the definition of the following statistical terms:
 - Mean
 - Variance
 - Standard deviation of the mean
 - Median
 - Mode
 - Standard deviation
- b. Explain the structure and function of distributions.
- c. Calculate the mathematical mean of a given set of data.
- d. Calculate the mathematical standard deviation of the mean of a given set of data.
- e. Given the data, calculate the probability of an event.

- f. Describe how measures of samples (i.e., measures of central tendency and variability) are used to estimate population parameters through statistical inference.
- g. Discuss Type I and Type II decision errors and the relationship to sampling and confidence levels.

Hydrology, Geology, and Soil Science

4. Waste management personnel shall demonstrate a familiarity level knowledge of the basic principles and concepts of hydrology, geology, and soil science.

Supporting Knowledge and/or Skills

- a. List the different soil textures (compositions) and soil structures.
- b. Define humus and explain its role in chemical reactions in the soil.
- c. Define erosion and describe the characteristics and effects of water and wind erosion.
- d. Describe the following processes and explain how water and soil interact in each:
 - Infiltration and percolation
 - Groundwater recharge
 - Runoff
 - Evapotranspiration
- e. Describe how soil characteristics, slope factors, and land cover conditions impact the detachment and transport processes of pollution.
- f. Discuss pollutant loading and the pollutant delivery ratio.
- g. Discuss the use of soil survey maps.
- h. Discuss the cation and anion exchange capacity of soils.
- i. Describe the hydrologic cycle.
- j. Define the following hydrologic terms and describe the relationships between them:
 - Precipitation
 - Stream flow
 - Evaporation
 - Transpiration
 - Subsurface water
 - Sedimentation
- k. Define the following groundwater terms and describe the relationships between

them:

- Capillary water
- Zone of saturation
- Specific yield
- Hydraulic conductivity
- Transmissivity
- Vadose zone

l. Define the following surface water terms:

- Mass curve
- Frequency analysis

m. Discuss the composition and identification of the following types of rocks and cite examples of each.

- Igneous
- Sedimentary
- Metamorphic

n. Describe the geometry and properties of the following rock masses:

- Folds
- Faults
- Structural Discontinuities
- Residual Stress
- Sheet Joints
- Structural discontinuities
- Shear strength of discontinuities
- Residual stress
- Sheet joints

o. Discuss the use of geological and geotechnical maps.

p. Describe the geologic considerations, criteria and procedures used to evaluate the following areas of topography:

- Relief
- Slope stability
- Flood plains
- Karst terrain

q. Discuss weathering and its significance in geotechnical engineering.

r. Discuss tests that assess weatherability.

- s. Discuss the process for logging rock cores.
- t. Describe how different soil types can affect contaminant transport.
- u. Describe the effect partition coefficients can have on contaminant transport.

Meteorology

5. Waste management personnel shall demonstrate a familiarity level knowledge of the basic principles and concepts of meteorology.

Supporting Knowledge and/or Skills

- a. Discuss the properties of high pressure and low pressure systems and their impact on air pollution.
- b. Discuss the following horizontal dispersion terms:
 - Wind rose
 - Pollution rose/plume meander
- c. Describe the role of lapse rate in determining dispersion coefficients.
 - Dry adiabatic lapse rate
 - Prevailing lapse rate
 - Neutral lapse rate
 - Subadiabatic lapse rate
 - Weak lapse rate
 - Inversion
 - Superadiabatic lapse rate
- d. Describe the classes of atmosphere stability, including inversions.
- e. Describe the kind of information given by a wind rose and pollution rose.

Environmental Biology

6. Waste management personnel shall demonstrate a familiarity level knowledge of the basic terms and concepts of environmental biology.

Supporting Knowledge and/or Skills

- a. Define the following terms:
 - Ecosystem
 - Habitat
 - Species
 - Pathways analysis

- Bioaccumulation
 - Bioconcentration
 - Biotoxicity
 - Biodiversity
- b. Discuss how synergism makes it difficult to establish a cause and effect relationship between pollutants and disease.

Engineering Drawings

7. Waste management personnel shall demonstrate a working level knowledge of engineering drawings.

Supporting Knowledge and/or Skills

- a. Given an engineering print, read and interpret the information contained in the title block, the notes and legend, the revision block, and the drawing grid.
- b. Identify the symbols used on engineering drawings for:
- Types of valves and actuators
 - Basic types of instrumentation.
 - Types of instrument signal controllers and modifiers
 - Types of system components (pumps, etc.)
 - Types of lines, piping and vessels
 - Types of materials of construction
- c. Identify the symbols used on engineering Piping and Instrument Drawings to denote the location of instruments, indicators, and controllers.
- d. Identify how valve conditions are depicted.
- e. Determine system flowpath(s) for a given valve lineup.

Heat Transfer, Fluid Flow and Thermodynamics

8. Waste management personnel shall demonstrate a familiarity level knowledge of basic heat transfer, fluid flow and thermodynamics concepts and theories.

Supporting Knowledge and/or Skills

- a. Define the following terms:
- Specific volume
 - Density
 - Specific gravity
 - Mass
 - Weight

- b. Describe the relationship between absolute pressure, gauge pressure, and vacuum.
- c. Define the following and describe their relationship:
 - Energy
 - Potential Energy
 - Kinetic Energy
 - Work
 - Heat
- d. Describe the following types of thermodynamic systems:
 - Isolated system
 - Open system
 - Closed system
- e. Using the ideal gas law discuss the relationship between pressure, temperature, and volume.
- f. Describe the effects of pressure and temperature changes on confined fluids.
- g. Describe how the density of a fluid varies with temperature.
- h. Describe the two types of heat exchanger construction.
- i. Describe hot and cold fluid flow in parallel flow, counter flow, and cross flow heat exchangers.
- j. Discuss the following heat exchanger applications:
 - Evaporator
 - Radiator
 - Condenser
 - Cooling tower
- k. Define the term buoyancy.
- l. Describe the relationship between the pressure in a fluid column and the density and depth of the fluid.
- m. Define the property of viscosity.
- n. Define the term head, head loss, and frictional loss, with respect to its use in fluid flow.
- o. Define the terms water and steam hammer and describe their physical affects on piping systems.

Waste Treatment Options

9. Waste management personnel shall demonstrate a familiarity level knowledge of evaluating treatment and disposal technologies.

- a. Describe the process for performing an analysis of alternative Waste Management options including cost, waste form/stability, regulatory compliance, emerging technologies and stakeholder involvement.

Problem Analysis

10. Waste management personnel shall demonstrate a working level knowledge of problem analysis principles and techniques necessary to determine potential causes of the problems, and identify corrective actions(s) as identified in DOE O 225.1A.

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:
 - Events and Causal Factors Charting
 - Root Cause Coding
 - Recommendation Generation
- c. Compare and contrast Type A, Type B, and Type C investigations and discuss an example of the application of each.
- 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 a contractor problem analysis and critique the results.

OPERATIONAL KNOWLEDGE

11. Waste management personnel shall demonstrate a familiarity level of knowledge of the training and qualification requirements for defense nuclear facility personnel described in DOE Order 5480.20.

Supporting Knowledge and/or Skills

- a. Discuss the purpose and scope of DOE O 5480.20.
- b. Describe the five elements of a systematic approach to training.
- c. Discuss the relationship between training, risk, and safe facility operations.
- d. Discuss key elements of an effective on-the-job training program.
- e. Identify the types of training records required to be retained as permanent records.

12. Waste management personnel shall demonstrate a familiarity level of knowledge of Conduct of Maintenance (DOE O 4330.4A) principles and Department of Energy requirements to ensure maintenance is performed in a safe and efficient manner.

Supporting Knowledge and/or Skills

- a. Explain the Department of Energy's role in the oversight of contractor maintenance operations.
- b. Explain the intent of DOE Order 4330.4A, "Maintenance Management Program".
- c. Define each of the following maintenance related terms and explain their relationship to each other:
 - Corrective
 - Preventive
 - Periodic
 - Planned
 - Reliability Centered
- d. Explain the purpose and content of a Master Equipment List.
- e. Describe the procedure development, verification, and validation process.
- f. Explain the purpose of maintaining good facility condition and housekeeping.
- g. Conduct a facility observation walk through and identify deficiencies often found with respect to Material, Housekeeping, Industrial Safety, and Radiological areas.
- h. Describe configuration control and its relationship to the maintenance work control process and the maintenance history file.
- i. Explain facility management's role in facility maintenance.

- j. Describe the purpose and scope of the Maintenance Implementation Plan.
- k. Identify the types of data and records required to be retained as permanent records.

13. Waste management personnel shall demonstrate a familiarity level knowledge of Department of Energy Technical Standard DOE-STD-1073-93, Guide for Operational Configuration Management Program.

Supporting Knowledge and/or Skills

- a. Describe the purpose and objectives of the Operational Configuration Management Program.
- b. Discuss what constitutes acceptable contractor compliance consistent with the requirements of DOE-STD-1073-93, Guide for Operational Configuration Management Program, for the following elements of the contractor's Configuration Management Plan:
 - Program planning
 - Equipment scope criteria
 - Concepts and terminology
 - Interfaces
 - Databases
 - Procedures
- c. Discuss the following elements of the Configuration Management Program:
 - Design requirements
 - Document control
 - Change control
 - Assessments
 - Design reconstitution adjunct
 - Material condition and aging adjunct
- d. Discuss the purpose, concepts, and general process for applying the graded approach to operational configuration management.
- e. Identify the types of data and records required to be retained as permanent records.

14. Waste management personnel shall demonstrate a working level knowledge of monitoring techniques related to environmental compliance.

Supporting Knowledge and/or Skills

- a. Describe the types of equipment used to monitor a site for the following:
 - Ambient air quality

- . Emissions
 - . Groundwater contamination
 - . Meteorological factors
 - . Streams and rivers contamination
 - . Soil and sediment contamination
 - . Wildlife contamination
- b. Describe the requirements of the following documents as they relate to environmental monitoring:
- . 10 CFR 61.53, Environmental Monitoring
 - . Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
 - . Resource Conservation and Recovery Act (RCRA)
 - . National Environmental Policy Act (NEPA)
 - . 40 CFR 136, Analytical Test Procedures
 - . 40 CFR 61, NESHAPs
- c. Describe the various quality assurance and quality control programs used to enhance data quality. Include in your discussion programs both internal and external to the Department.
- d. Describe the standard methods for the examination of water and wastewater.
- e. Given a sampling parameter/equipment, describe the standard sampling methods and protocols.
- 15. Waste management personnel shall demonstrate a familiarity level knowledge of the purpose and uses of environmental sampling and monitoring equipment.**

Supporting Knowledge and/or Skills

- a. Explain the reason for measuring emissions, meteorological factors and ambient air quality under various operation conditions (e.g., routine and emergency).
- b. Describe the purpose and limitations of the following air quality measurement instruments:
- . High volume particulate sampler
 - . Liquid bubbler (e.g., for sulfur dioxide)
 - . Infrared spectrometer
- c. Describe the purpose and types of material collected by the following sampling media:
- . High efficiency glass fiber filter
 - . Activated charcoal cartridge
 - . Silica gel

- d. Describe the purpose for measuring each of the following parameters during field surveys of water quality:
 - Temperature
 - Dissolved oxygen
 - Conductivity
 - pH
- e. Discuss the factors that can affect readings and the preservation methods for the field measurements listed above.
- f. Describe how trace toxic organics in water are assayed by gas chromatography.
- g. Describe how heavy metals in water are measured using atomic absorption spectrophotometry.
- h. Describe how volatile organics are measured.
- i. Identify the types of data and records required to be retained as permanent records.

Mechanical Systems

- 16. Waste management personnel shall demonstrate a familiarity level knowledge of basic pneumatic and hydraulic systems in the areas of components, operations, and theory.**

Supporting Knowledge and/or Skills

- a. Define the following and discuss their relationship:
 - Force
 - Pressure
 - Pneumatic
 - Hydraulic
- b. Describe the basic operation of a pneumatic system.
- c. Describe the basic operation of a hydraulic system.
- d. Identify the hazards associated with pneumatic and hydraulic systems and their components.

- 17. Waste management personnel shall demonstrate a familiarity level knowledge of pump construction, operations, and theory.**

Supporting Knowledge and/or Skills

- a. Describe the principles of operation for centrifugal pumps.

- b. Describe the principles of operations for positive displacement pumps.
- c. Define the following terms and explain their relationship:
 - Net Positive Suction Head
 - Cavitation

18. Waste management personnel shall demonstrate a familiarity level knowledge of valve construction, operations, and theory.

Supporting Knowledge and/or Skills

- a. Given a drawing of a valve, identify the major component parts.
- b. Given a drawing of a valve, identify which of the following type of valve it is:
 - Gate
 - Globe
 - Relief/Safety
 - Ball
 - Check
- c. Describe the construction and principle of operation for the following types of valve actuators:
 - Manual
 - Electric
 - Solenoid
 - Pneumatic
 - Hydraulic

19. Waste management personnel shall demonstrate a familiarity level knowledge of basic strainer and filter construction, operations, and theory.

Supporting Knowledge and/or Skills

- a. Describe the following types of filters, including an example of typical use:
 - Cartridge filters
 - Pre-coated filters
 - Deep-bed filters
 - HEPA filters
- b. Describe the following types of strainers, including an example of typical use:
 - Bucket strainer
 - Duplex strainer

HVAC

- 20. Waste management personnel shall demonstrate a familiarity level knowledge of basic heating, ventilation, and air conditioning system (HVAC) construction and operations, the potential of these systems as 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
 - Heat exchangers
 - Scrubbers
 - Hoods
 - Glove Boxes
 - Pressure sensors
- b. Discuss the relationships between the following in HVAC systems:
 - Supply Ventilation
 - Flow
 - Exhaust Ventilation
- c. Describe the types of refrigerants used in air conditioning systems.
- d. Discuss the hazards associated with these refrigerants.
- e. Describe the purpose of the HVAC system in the following applications:
 - Hoods
 - Glove boxes
 - Hot Cells
 - Confinement systems
- f. Discuss the reason for and significance of the following system parameters:
 - Positive vs. Negative system pressure
 - Differential pressure across filters
 - Differential pressure across components

- g. Describe how ventilation systems may be used for contamination control.

Instrumentation and Controls

21. Waste management personnel shall demonstrate a familiarity level knowledge of process instrumentation principles of operation, purpose and uses.

Supporting Knowledge and/or Skills

- a. Explain the reason for measuring temperature, pressure, flow, and fluid level.
- b. List the three basic functions that temperature, pressure, flow, and fluid level detectors provide.
- c. For the temperature detection devices listed, explain how the instrument provides an output representative of the temperature being measured:
 - Thermocouple (TC)
 - Resistance Temperature Detector (RTD)
- d. For the pressure detection devices listed, explain how the instrument provides an output representative of the pressure being measured:
 - Bellows type
 - Bourdon tube type
- e. For the fluid level detection devices listed, explain how the instrument provides an output representative of the level being measured:
 - Gauge-glass type
 - Conductive probe type
 - Magnetic bond type
 - Differential pressure type
 - Ball float type
- f. For the flow detection devices listed, explain how the instrument provides an output representative of the flow being measured:
 - Orifice plate type
 - Venturi tube type
 - Pitot tube type
 - Displacement type
 - Electromagnetic

INTEGRATED SAFETY MANAGEMENT

22. Waste management personnel shall demonstrate the ability to assess contractors compliance with DOE P 450.4, Safety Management Policy.

Supporting Knowledge and/or Skills

- a. 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.
- b. Given the Integrated Safety Management System (ISMS) guide discuss the process for tailoring the ISMS to Waste Management activities, including both DOE and contractor responsibilities in the tailoring process.
- c. Using the ISMS Guide, prepare an action plan which adequately outlines interviews and observations, and details documents to review during an evaluation of contractor compliance with the requirements of DOE P 450.4, Safety Management Policy.
- d. Using the ISMS Guide, evaluate contractor compliance with the requirements of DOE P 450.4, Safety Management Policy. During this evaluation, demonstrate the ability to properly conduct interviews, observations, and document reviews.
- e. Given data from an evaluation, analyze the results of the evaluation to determine contractor compliance or noncompliance of the requirements.
- f. Given the results from an analysis of contractor compliance or noncompliance, document the results and communicate the results to contractor and Department line management.
- g. 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

23. Waste management personnel shall demonstrate familiarity level of knowledge of the following DOE Orders:

- **DOE Order 420.1, Facility Safety**
- **DOE Order 414.1, Quality Assurance**

Supporting Knowledge and/or Skills

- a. Discuss the purpose, scope, and application of the listed Orders, policies, and circulars. Include in this discussion key terms, essential elements, and personnel responsibilities and authorities.
- b. Discuss the contractor's responsibilities for environmental safety and health protection as stated in the above documents.

24. Waste management 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 project manager responsibilities set forth in DOE Order 440.1A, Worker Protection Management for DOE Federal and Contractor Employees.
- b. Discuss the construction contractor's responsibilities under DOE 440.1A, Worker Protection Management for DOE Federal and Contractor Employees:
 - Establishing a safety program
 - Worksite presence during work activities
 - Compliance by subcontractors
- c. Discuss the contractor's responsibility for providing necessary training to employees in the area of safety and health on the worksite.
- d. Discuss the project manager's responsibility for on-site safety and health inspections.
- e. Discuss the contractor's required response to an identified safety and/or health hazard.

25. Waste management personnel shall demonstrate a working level knowledge of the requirements for the use of personal protective equipment for chemical hazards.

Supporting Knowledge and/or Skills

- a. Describe the principles governing the selection, use, and limitations of the following:
 - Respirators
 - Protective clothing
- b. Describe the various types of equipment (devices or clothing) worn to protect a worker from exposure to hazardous substances.
- c. Given a work procedure and atmospheric conditions, identify the appropriate type of respiratory protection for the activity.
- d. Describe the four levels (A,B,C & D) of protection for workers at hazardous waste sites or for those workers conducting emergency response activities as defined by the Environmental Protection Agency.

26. Waste management personnel shall demonstrate a working level knowledge of Department of Energy radiation protection requirements sufficient to assess the effectiveness of radioactive material containment, exposure control, and radiological work practices.

Supporting Knowledge and/or Skills

- a. 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 devices
- b. Describe and explain the radiological concerns in the design, construction, and operation of containment and confinement systems.
- c. Discuss the design and operational characteristics of containment and confinement systems that minimize personnel radiation exposure.

27. Waste management personnel shall demonstrate a working level knowledge of the safety-related requirements for hazardous substances.

Supporting Knowledge and/or Skills

- a. Discuss the hazards associated with the use of corrosives (acids and alkali's).
- 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. Discuss the general safety precautions regarding the use, handling, and storage of compressed gases, including but not limited to hydrogen, oxygen, and nitrogen.
- f. Discuss the safety precautions for working with cryogenic liquids.
- g. Explain the difference between a flammable liquid and a combustible liquid.
- h. Describe the general safety precautions regarding the use, handling, and storage of flammable and combustible liquids.

28. Waste management personnel shall demonstrate a working level knowledge of hazardous waste operations and their impact on worker safety and health.

Supporting Knowledge and/or Skills

- a. Describe the industrial process associated with hazardous waste operations as they pertain to Waste Management.
- b. Explain the personnel hazards associated with the following:
 - Polychlorinated Biphenyls (PCB) handling
 - Asbestos handling
 - Biological hazards (such as Hanta virus, animal carcasses, and medical waste)
 - Solvents
 - Paint residual handling
 - Waste oil

29. Waste management personnel shall demonstrate a working level knowledge of the principles, concepts, and requirements of environmental risk assessment.

Supporting Knowledge and/or Skills

- a. Define risk assessment, risk management, and risk communication.
- b. Describe the steps of a risk assessment.
- c. Describe how risk assessment helps in site decision-making.
- d. Define the term "Baseline Risk Assessment."
- e. Describe the process for a Toxicity Assessment.
- f. Describe the process for an Exposure Assessment.
- g. Describe the process used to characterize risk.
- h. Identify the types of data and records required to be retained as permanent records.

30. Waste management personnel shall demonstrate a working level knowledge of the purpose and requirements of DOE O 5400.5, Radiation Protection of the Public and Environment and 10 CFR 834, Radiation Protection of the Public and 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 O 5400.5.
- 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. List and discuss the factors that must be considered pertaining to the release of materials and equipment having residual radioactive material as outlined in Chapter IV, Residual Radioactive Material Cleanup.
- d. Identify and discuss the release criteria for:
- . soil
 - . air/water
 - . surface
 - . real property
- e. Describe the radiological liquid effluent requirements established in DOE 5400.5, Radiation Protection of the Public and the Environment, and 10 CFR Part 834, Radiation Protection of the Public and Environment.

31. Waste management personnel shall demonstrate the ability to appraise the contractor's program(s) to assess compliance with the requirements for environmental radiation protection.

Supporting Knowledge and/or Skills

- a. Assess whether the effluent monitoring from a facility meets the requirements of DOE O 5400.5, Radiation Protection of the Public and the Environment, 10 CFR 834, Radiation Protection of the Public and Environment.

- b. Assess whether adequate methods are used to characterize effluents for purposes of limiting doses to the public in accordance with regulatory and “as low as reasonably achievable (ALARA)” limits.
- c. Assess whether the Environmental Radiological Protection Program is in accordance with 10 CFR 834, Radiation Protection of the Public and Environment.
- d. Identify the types of data and records required to be retained as permanent records.

AUTHORIZATION BASIS DOCUMENTATION

32. Waste management personnel shall demonstrate a familiarity level knowledge of Nuclear Safety Analysis Reports as described in DOE Order 5480.23, Nuclear Safety Analysis Reports.

Supporting Knowledge and/or Skills

- a. Discuss the basic purposes and objectives of Nuclear Safety Analysis Reports.
- b. Describe the responsibilities of contractors authorized to operate defense nuclear facilities regarding the development and maintenance of a Nuclear Safety Analysis Report.
- c. Define the following terms and discuss the purpose of each:
 - Design basis
 - Authorization basis
 - Engineered safety features
 - Safety analysis
- d. Describe the requirements for the scope and content of a Nuclear Safety Analysis Report and discuss the general content of each of the required sections of a Nuclear Safety Analysis Report.
- e. Discuss the ways that contractor management makes use of Nuclear Safety Analysis Reports.
- f. Identify the types of data and records required to be retained as permanent records.

33. 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.

34. Waste Management personnel shall demonstrate familiarity level knowledge of DOE O 5480.21, Unreviewed Safety Questions.

Supporting Knowledge and/or Skills

- a. Discuss the reasons for performing an unreviewed safety question determination.
- b. Define the following terms:
- Accident analyses
 - Safety evaluation
 - Technical safety requirements
- c. Describe the situations which require a safety evaluation to be performed.
- d. Define the conditions for an unreviewed safety question.
- e. Describe the responsibilities of contractors authorized to operate defense nuclear facilities for the performance of safety evaluations.
- f. 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.
- g. Discuss the action(s) to be taken if it is determined that an unreviewed safety question is involved.
- h. Discuss the qualification and training requirements for personnel who perform safety evaluations.

35. Waste Management personnel shall demonstrate familiarity level knowledge of the technical safety requirements as described in DOE O 5480.22, Technical Safety 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 general content of each of the following sections of the technical safety requirements:
 - Use and application
 - Safety limits
 - Operating limits
 - Surveillance requirements
 - Administrative controls
 - Design features
- e. Discuss the possible source documents that may be used in developing technical safety requirements.
- f. Discuss the conditions that constitute a violation of the technical safety requirements and state the reporting requirements should a violation occur.

36. Waste management personnel shall demonstrate a working level knowledge of Department of Energy (DOE) Order 5480.24, Nuclear Criticality Safety, with respect to its impact on Department nuclear safety.

Supporting Knowledge and/or Skills

- a. Discuss the purpose and policy associated with DOE Order 5480.24, Nuclear Criticality Safety.
- b. Define the following terms associated with nuclear criticality safety:
 - Criticality incident
 - Double contingency principle
 - Geometry control
 - Nuclear criticality safety
 - Significant quantity of fissionable material
 - Temporary exemption
- c. Discuss the Contractor responsibilities for the following in relation to criticality safety activities:
 - Criticality safety evaluations
 - Monitoring
 - Surveillance
 - Transportation
 - Storage
- d. Identify the types of data and records required to be retained as permanent records.

37. Waste management personnel shall demonstrate a working level knowledge of the Price-Anderson Amendment Act of 1988 and its impact on Department of Energy nuclear safety activities.

Supporting Knowledge and/or Skills

- a. Describe the purpose and scope of the Price-Anderson Amendment Act.
- b. Discuss the Act's applicability to the Department nuclear safety activities.
- c. Discuss the civil and criminal penalties imposed on the Department, Management and Operating Contractors, and Subcontractors as the result of a violation of applicable rules and regulations related to nuclear safety.
- d. Discuss the requirements associated with the topics below, as they are affected by Rule-making aspect of the Price-Anderson Amendment Act:
 - Safety Analysis Reports
 - Unreviewed Safety Questions
 - Quality Assurance Requirements
 - Defect Identification and Reporting
 - Conduct of Operations at DOE Nuclear Facilities
 - Technical Safety Requirements
 - Training and Certification
 - Maintenance Management
 - Categorization, Notification, Reporting, and Processing of Operational Occurrences at DOE Nuclear Facilities

38. Waste management personnel shall demonstrate familiarity level knowledge of DOE O 232.1, Occurrence Reporting and Processing of Operations Information.

Supporting Knowledge and/or Skills

- a. State the purpose of the Order.
- 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 the Order.
- d. State the different categories of reportable occurrences and discuss each.

- e. Refer to Attachment 1 to DOE O 232.1, Occurrence Reporting and Processing of Operations Information, and discuss the role of Waste Management in Waste Management-related reportable occurrences.

FUNCTIONAL AREA SPECIFIC

39. 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. Define the following terms:
 - Effluent
 - Environmental Monitoring
 - Environmental Protection Standard
 - Effluent Monitoring
 - Environmental Surveillance
 - Environmental Occurrence
 - Pollution Prevention
- b. Discuss the Department's policy pertaining to the environmentally safe and sound operation of its facilities.
- c. Discuss the requirements for Notification and Reports. 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
- d. Discuss the requirements for an Environmental Protection Program. Include the following as a minimum:
 - Implementation Plan
 - Long Range Environmental Protection Plan
 - Special Program Planning Requirements
- e. Discuss the requirements for Environmental Monitoring. Include the following as a minimum:
 - Pre-operational monitoring of facilities, sites, and operations
 - Environmental monitoring plans
 - Environmental monitoring - general requirements
 - Meteorological monitoring program
 - Radiological and non-radiological monitoring
 - Groundwater monitoring program

40. Waste management personnel shall demonstrate a familiarity level knowledge of the Clean Air Act (CAA) and implementing regulations.

Supporting Knowledge and/or Skills

- a. Discuss the application of the Clean Air Act to the Department of Energy and its facilities.
- b. Identify the National Ambient Air Quality Standards (primary and secondary) and the National Emission Standards for Hazardous Air Pollutants (NESHAP) as they apply to attainment and non-attainment areas.
- c. Describe the requirements for permitting, monitoring and reporting prescribed in the regulations that implement Title V of the Clean Air Act.
- d. Describe the prevention of significant deterioration (PSD) regarding the requirements established by the Clean Air Act.
- e. Identify the major sources and emission limitations per the Clean Air Act.
- f. Discuss the New Source Performance Standards (40 CFR 60).
- g. Discuss the potential liabilities of the Department of Energy and its contractors inherent in the enforcement of environmental regulations (i.e., compliance orders, enforcement actions, fines and penalties, and provisions for civil suits).
- h. Describe the Clean Air Act, Title V, Stratospheric Ozone Protection criteria.
- i. Identify the types of data and records required to be retained as permanent records.

41. Waste management personnel shall demonstrate a familiarity level knowledge of the following laws and regulations as related to the environmental medium of water:

- . **Clean Water Act (CWA)**
- . **Safe Drinking Water Act (SDWA)**
- . **Resource Conservation and Recovery Act (RCRA) (groundwater provisions)**
- . **National Groundwater Protection Policy (NGPP)**
- . **Oil Pollution Act**

Supporting Knowledge and/or Skills

- a. Discuss the application of the above laws and regulations to the Department of Energy and its facilities.
- b. Describe water quality criteria and stream use classification identified in the Clean Water Act.

- c. Discuss the Clean Water Act permitting requirements including monitoring and reporting. Include in the discussion, National Pollutant Discharge Elimination System Program and the Rivers and Harbors Act Dredge/Fill material permits, as applicable.
- d. Describe the reporting requirements identified in the Clean Water Act.
- e. Discuss the standards for maximum contaminant levels (primary and secondary) contained in the Safe Drinking Water Act.
- f. Identify the groundwater protection requirements applicable to interim status Resource Conservation and Recovery Act's (RCRA) facilities in RCRA's implementing regulations, Subpart F of 40 CFR 265.
- g. Identify the groundwater protection requirements applicable to permitted Resource Conservation and Recovery Act (RCRA) facilities in RCRA's implementing regulations, Subpart F of 40 CFR 264 and in the facility's permit.
- h. Discuss the storm water management aspects of the National Pollutant Discharge Elimination Standard (NPDES).
- i. Explain the spill prevention and control requirements of the Clean Water Act (40 CFR 109-114).
- j. Discuss how the National Pollution Discharge Elimination System applies to and impacts Department waste management programs.
- k. Identify the requirements in the National Pollution Discharge Elimination System that apply to waste management.
- l. Identify the types of data and records required to be retained as permanent records.

42. Waste management personnel shall demonstrate the ability to review the following National Environmental Policy Act documentation:

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

Supporting Knowledge and/or Skills

- a. Explain the purpose and scope of the Council on Environmental Quality Regulations implementing the National Environmental Policy Act (40 CFR 1500-1508).
- b. Discuss the purpose and scope of DOE O 451.1A, National Environmental Policy Act Compliance Program and the relationship with 40 CFR 1500.

- c. Discuss the content and procedures specified by the Department implementing regulations 10 CFR 1021, Compliance with the National Environmental Policy Act and Secretarial Policy on the National Environmental Policy, June 13, 1994.
- d. Discuss the applicability for each of the documents identified above and the responsibilities for reviewing these documents.
- e. Discuss the different areas that are analyzed in an EIS to determine the affect on the environment (i.e. geologic resources, groundwater, meteorology, ecological, public health and safety, etc.)
- f. Describe the public participation process.
- g. Discuss the integration of consultation requirements under other environmental legislation (e.g., National Environmental Policy Act and Endangered Species Act and Fish and Wildlife Coordination Act).
- h. Discuss the potential liabilities of the Department and its contractors inherent in the NEPA process.
- i. Identify the types of data and records required to be retained as permanent records.

43. Waste management personnel shall demonstrate a familiarity level knowledge of the following as it relates to waste management.

- . **Atomic Energy Act**
- . **Low Level Waste Policy Amendment Act**

Supporting Knowledge and/or Skills

- a. Discuss the responsibilities of states and the federal government identified under the Atomic Energy Act.
- b. Define the following terms and their implications for regulation in the Department of Energy:
 - . Agreement State
 - . Allocation
 - . Compact
 - . Sited Compact Region
- c. Describe the federal government disposal responsibilities under the Low Level Waste Policy Amendment Act (LLWPAA).
- d. Identify the federal government responsibilities for disposing of low level waste at a non-federal facility per the LLWPAA.

44. Waste management personnel shall demonstrate a working level knowledge of the storage and disposal of Polychlorinated Biphenyl (PCB) waste as regulated by

10 CFR Part 761.

Supporting Knowledge and/or Skills

- a. Describe the structure and properties of PCBs.
 - b. Discuss PCB decomposition products and their toxicity.
 - c. Explain why PCBs are banned or otherwise controlled.
 - d. Explain the two types of PCB hierarchy and position an item/material in the PCB hierarchy (e.g., PCB liquid / non-liquid, PCB Items)
 - e. Discuss how the PCB concentration is established.
 - f. Determine whether an item/material is a PCB waste.
 - g. Discuss the marking of PCB transport vehicles.
 - h. Discuss PCB storage requirements including time limitations, temporary storage, general storage unit requirements, alternate storage units, container requirements, inspection requirements, and markings.
 - i. Define PCB/Radioactive Waste and explain how it differs with regard to exemptions to time and general storage requirements. Discuss how PCB/Radioactive Waste is disposed (e.g., discuss the special provisions of 10 CFR 761.50(b)(7)).
 - j. Discuss PCB disposal requirements including disposal prohibitions, combustion, and landfilling.
 - k. Define PCB Remediation Waste and discuss how it is disposed.
 - l. Define PCB Bulk Product Waste and discuss how it is disposed.
 - m. Define PCB Waste from Research and Development Activities and discuss how it is disposed.
 - n. Define PCB Waste from Decontamination Waste and Residues and discuss how it is disposed.
 - o. Discuss PCB spill reporting and cleanup.
- 45. Waste management personnel shall demonstrate a working level knowledge of the reporting of the releases of hazardous chemicals and community right-to-know reporting as regulated by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA).**

Supporting Knowledge and/or Skills

- a. Identify the statutes, regulations, and executive orders governing release reporting and community right-to-know reporting.
- b. Discuss the importance of complying with the release reporting and community right-to-know reporting.
- c. Define a CERCLA hazardous substance.
- d. Define Reportable Quantities (RQs) and explain how RQs are applied and used.
- e. Discuss how it is determined if a release is reportable under CERCLA. Explain for releases containing only one hazardous substance and for releases containing mixtures of hazardous substances. Discuss exemptions to the reporting requirements.
- f. Discuss how releases of hazardous substances are identified and the reporting requirements including time, to whom and by whom, definition of facility, definition of environment.
- g. Discuss the purpose of the Emergency Planning and Community Right-To-Know Act and DOE's role in its implementation within a community.
- h. Define Threshold Planning Quantities (TPQs).
- i. Discuss DOE's responsibilities for facilities which contain greater than TPQs.
- j. Identify the four characteristics of a sound EPCRA program at a DOE site.

46. Waste management personnel shall demonstrate a working level knowledge of the Federal Facility Compliance Act of 1992 (FFCAct).

Supporting Knowledge and/or Skills

- a. Discuss the major requirements of the FFCAct including:
 - Waiver of Sovereign Immunity for DOE
 - Mixed Waste Inventory Report
 - Mixed Waste Treatment Capacities and Technologies Report
 - Chief Financial Officer's Report
 - Site Treatment Plan
 - State Agreement (Consent Order)
- b. Discuss the content of the Site Treatment Plan at the site including the identification of mixed waste streams, the development of treatment capacities, technology development needs, and schedules. Explain how the Site Treatment Plan is maintained (e.g., updated).

- c. Discuss the content of the Consent Order at the site including the requirements for identification of new waste streams, treatment of mixed waste from offsite, adherence to schedules, changes to treatment strategy, updates and revisions, and penalties for non-compliance.

47. Waste management personnel shall demonstrate a familiarity level knowledge of the supporting environmental laws and regulations including:

- **Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)**
- **Endangered Species Act (ESA)**
- **National Historic Preservation Act**
- **American Indian Religious Freedom Act**
- **DOE American Indian Policy**

Supporting Knowledge and/or Skills

- a. Describe the process for licensing applicators as defined in the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).
- b. Discuss the Endangered Species Act consultation requirements.
- c. Discuss the requirements of the National Historic Preservation Act and the American Indian Religious Freedom Act.
- d. Discuss the Department's policy on American Indians.

48. Waste management personnel shall demonstrate a working level knowledge of the management and negotiation of regulatory requirements.

Supporting Knowledge and/or Skills

- a. Describe the responsibilities involved with the management of documents such as:
 - National Pollutant Discharge Elimination System Permit
 - Federal Facility Agreement
 - Consent Orders & Settlement Agreements
 - Record Of Decision
 - Resource Conservation and Recovery Act Part B Permit
 - Grant conditions
 - Monitoring requirements
- b. Discuss the requirements and methods of negotiation for documents such as:
 - National Pollutant Discharge Elimination System Permit
 - Federal Facility Agreement
 - Consent Order & Settlement Agreements
 - Record Of Decision
 - Resource Conservation and Recovery Act Part B Permit

- . Grant conditions
- . Monitoring requirements

49. Waste management personnel shall demonstrate a familiarity level knowledge of how environmental laws and regulations are enforced.

Supporting Knowledge and/or Skills

- a. Discuss the interrelationship between the following:
 - . Environmental law
 - . The United States Code
 - . The Code of Federal Regulations
 - . State Laws and Regulations
- b. Describe the organization, mission, and enforcement authorities of the Environmental Protection Agency (EPA) and applicable state regulatory agencies.
- c. Discuss the role of the Department's legal counsel in Waste Management activities.
- d. Discuss the enforcement of environmental statutes under civil and criminal authorities.
- e. Discuss the potential liabilities of the Department and its contractors inherent in the enforcement of environmental regulations (i.e., compliance orders, enforcement actions, fines and penalties, and provisions for civil suits).

50. Waste management personnel shall demonstrate a familiarity level knowledge of the development, review, and assessment of the following Comprehensive Environmental Response, Compensation, and Liability Act documentation.

- × Remedial Investigation Feasibility Study
- × Investigative Work Plan Report
- × Permits
- × National Pollution Discharge Elimination System
- × Record of Decision
- × Remedial Design
- × Remedial Work Plan
- × Consent Order & Settlement Agreement

Supporting Knowledge and/or Skills

- a. Describe the process for developing the listed documents.
- b. Discuss the requirements for each document and describe the process for reviewing the listed documents.
- c. Discuss the use of non-time critical removal action process as it applies to conducting decommissioning activities.

51. Waste management personnel shall demonstrate working level knowledge of hazardous waste as described in 40 CFR, Resource Conservation and Recovery Act.

Supporting Knowledge and/or Skills

- a. Define the term "hazardous waste."
- b. Using the decision tree in 40 CFR Part 260, relate RCRA solid waste to hazardous waste and identify the applicable RCRA regulations for each.
- c. Identify the kinds of hazardous wastes generated within the Department and their sources.
- d. Describe the combination of treatment, storage, and disposal facilities used to manage hazardous wastes.
- e. Discuss the current methods of disposing of hazardous wastes.
- f. 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
- g. 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
- h. Discuss the Resource Conservation and Recovery Act regulatory requirements for:
 - . Recyclable materials
 - . Incinerators, and
 - . Disposal facilities
- i. Describe the treatment standards required under the Land Disposal Restrictions, and describe the prohibition on storage as required by 40 CFR 268.

- j. Discuss Resource Conservation and Recovery Act permitting requirements and requirements associated with modifying permits, as defined in 40 CFR 270.
- k. Explain the relationship between the Resource Conservation and Recovery Act and the Federal Facilities Compliance Act (FFCA). Include in your discussion the development of Site Treatment Plans and development of Waste Treatment Technologies.
- l. Describe the types of facilities that need Resource Conservation and Recovery Act permits; list differences between a RCRA Part A and a RCRA Part B permit application; and give examples of RCRA Part B permit application requirements that apply to all facilities and those that apply to specific types of facilities.
- m. Describe how to determine if a material is a solid waste. Given a material that is a solid waste, describe how to determine if it is a hazardous or a mixed waste.
- n. Discuss the Land Disposal Restrictions, including the different types of treatment standards, the dilution prohibition, the storage prohibition, and different types of variances and exemptions.
- o. Discuss the regulatory requirements applicable to Federal facility solid waste landfills (including Resource Conservation and Recovery Act Subtitle D).
- p. Discuss the Personal Protective Equipment (PPE) requirements for work activities in hazardous areas.
- q. Discuss the potential liabilities of the Department of Energy and its contractors inherent in the enforcement of environmental regulations (i.e., compliance orders, enforcement actions, fines and penalties, and provisions for civil suits).
- r. Discuss the Resource Conservation and Recovery Act underground storage tank regulations (Subtitle I).
- s. Describe the relationship of the Hazardous Materials Transportation Act (49 CFR Parts 170-179) to the Resource Conservation and Recovery Act transportation regulations (40 CFR Part 263).
- t. Identify the types of data and records required to be retained as permanent records.

52. Waste management personnel shall demonstrate expert level knowledge of the management of low-level radioactive waste as described in DOE O 435.1, Radioactive Waste Management:

Supporting Knowledge and/or Skills

- a. Define low-level waste.

- b. Evaluate and determine the requirements for LLW management including mixed low-level, TSCA-Regulated, Accelerator-Produced, 11e.(2) and naturally occurring radioactive material waste.
 - c. Evaluate and determine the requirements for treatment, storage and disposal facility operations.
 - d. Discuss the Complex-wide Low-level Waste Management Program.
 - e. Review and evaluate the specific management controls included in the Radioactive Waste Management Basis.
 - f. Evaluate and determine the contingency actions for storage and transfer equipment.
 - g. Evaluate and determine the waste acceptance requirements for low-level waste.
 - h. Discuss life cycle planning and waste with no identified path to disposal as it relates to waste generation planning.
 - i. Evaluate and determine the minimum relevant information for characterizing low-level waste.
 - j. Discuss the waste certification program for low-level waste.
 - k. Discuss the packaging and transportation requirements for low-level waste.
 - l. Evaluate and determine the storage prohibitions for low-level waste.
 - m. Evaluate the attainment of the performance objectives for disposal of low-level waste.
 - n. Review and evaluate a Performance Assessment.
 - o. Review and evaluate a Composite Analysis.
 - p. Determine and evaluate the maintenance requirements for Performance Assessments and Composite Analysis.
 - q. Evaluate and determine the closure plan requirements for disposal facility operations.
 - r. Evaluate and determine the monitoring requirements for low-waste facilities.
 - s. Identify the types of data and records required to be retained as permanent records.
- 53. Waste management personnel shall demonstrate a expert level knowledge of the management of transuranic waste as described in Department of Energy (DOE) Order 435.1, 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. Evaluate and determine the requirements for management of transuranic, mixed transuranic and TSCA-Regulated waste.
- c. Review and evaluate the site Radioactive Waste Management Basis.
- d. Evaluate and determine the waste acceptance requirements for all transuranic waste storage, treatment, or disposal facilities.
- e. Discuss life-cycle planning and waste with no identified path to disposal as it relates to waste generation planning.
- f. Evaluate and determine the minimum relevant information for characterizing transuranic waste.
- g. Discuss the waste certification program for transuranic waste.
- h. Discuss the packaging and transportation requirements for transuranic waste.
- i. Evaluate and determine the storage prohibitions for transuranic waste.
- j. Evaluate and determine the monitoring requirements for transuranic waste facilities.
- k. Identify the types of data and records required to be retained as permanent records.

54. Waste management personnel shall demonstrate a expert 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 435.1, Radioactive Waste Management.

Supporting Knowledge and/or Skills

- a. Define the term "high-level waste," and list potential sources of high-level waste from operations within the Complex.
- b. Define "waste incidental to reprocessing" and explain how it is managed.
- c. Evaluate and determine the requirements for treatment, storage and disposal facility operations.
- d. Evaluate and determine the requirements for management of high level waste including mixed high-level and TSCA-regulated waste.
- e. Review and evaluate the site Radioactive Waste Management Basis.
- f. Evaluate and determine the contingency actions for storage and transfer equipment.

- g. Identify when operations must be curtailed.
- h. Evaluate and determine the minimum waste acceptance requirements for all high level waste storage, pretreatment, or treatment facilities, operation and activities.
- i. Discuss in the waste generation planning, life-cycle planning and waste with no identified path to disposal.
- j. Discuss the waste certification program.
- k. Review and evaluate the structural integrity program for tanks.
- l. Evaluate and determine the areas to be monitored for high-level waste pretreatment, treatment, storage and transportation facilities.
- m. Identify the types of data and records required to be retained as permanent records.

55. Waste management personnel shall demonstrate a familiarity knowledge level of the packaging and transportation of waste as described in DOE Order 460.1, Packaging and Transportation Safety and DOE Order 460.2, Departmental Materials Transportation and Package Management:

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 selecting shipping containers.
- c. Discuss the labeling, placarding, and shipping requirements specified in the requirements of 49 CFR (Placarding, Labeling, and Shipping).

56. Waste management personnel shall demonstrate the ability to appraise the contractor's program(s) and/or permits to assess compliance with the requirements for Waste Management.

Supporting Knowledge and/or Skills

- a. Assess the contractor's plans and procedures for low-level, transuranic, mixed and high level waste to ensure compliance with the DOE O 435.1.
- b. Given a proposed permit application for mixed waste, evaluate it for compliance with the Resource Conservation and Recovery Act requirements.
- c. Assess the contractor's plans and procedures for waste generation to ensure compliance with DOE O 435.1.

57. Waste management personnel shall demonstrate a familiarity 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.

58. 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.

59. 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.

60. 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.
- d. Discuss the potential liabilities of the Department of Energy and its contractors inherent in the enforcement of environmental regulations (i.e., compliance orders, enforcement actions, fines and penalties, and provisions for civil suits).

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

Supporting Knowledge and/or Skills

- a. Define the following terms:
 - Pollution/pollutants
 - Recycling
 - Waste minimization
 - Pollution prevention
- b. Discuss the Department's policy pertaining to the pollution prevention.
- c. Define source reduction and provide a list of source reduction technologies.
- d. Discuss the purpose of Executive Order 12856, Federal Compliance with Right-to-Know laws and Pollution Prevention Requirements.
- e. Discuss the purpose of Executive Order 13101, Greening Government through Waste Prevention, Recycling, and Federal Acquisition.
- f. Discuss how the Pollution Prevention Act applies to and impacts Department waste management programs.

- g. Identify the requirements contained in the Pollution Prevention Act that apply to waste management.

62. Waste management personnel shall demonstrate a working level knowledge of financial management necessary to integrate program resources and apply those resources to meet project commitments as described in Department of Energy (DOE) Guide 430.1-1, Life Cycle Asset Management.

Supporting Knowledge and/or Skills

- a. Define the term "Work Breakdown Structure" and discuss the process for developing one.
- b. Define and compare the terms "cost estimate" and "budget."
- c. Describe the process for preparing cost estimates and budgets.
- d. Describe and compare labor and non-labor costs.
- e. Describe and compare direct and indirect costs.
- f. Discuss methods of reducing indirect costs.
- g. Discuss the importance of determining the measure for work performed before work starts.
- h. Describe methods for measuring work performed.
- i. Discuss schedule and cost variance.
- j. Given actual project management documentation and data, identify budgeted cost of work scheduled, budgeted cost of work performed, actual cost of work performed, and determine the schedule variance and cost variance.
- k. Describe the types of Earned Value and how they are measured.
- l. Explain what is meant by the term "baseline" as it relates to project management.
- m. Describe the types of data required to forecast cost and schedule performance.
- n. Define the term "Life Cycle Cost Estimate."
- o. Given sample data, calculate "Life Cycle Cost Estimate."
- p. Discuss the importance of formal change control with regard to project management.
- q. Discuss the use of strategic planning, and how such planning relates to ongoing operations and safety of operations.

- r. Establish the terms of contractor performance elements and monitor and assess contractor performance against those performance elements.

APPENDIX A

CONTINUING EDUCATION, TRAINING AND PROFICIENCY PROGRAM

The following list represents suggested continuing education, training and other opportunities that are available for waste management personnel after completion of the competency requirements in this technical Functional Area Qualification Standard. It is extremely important that personnel involved waste management 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.

Based on the knowledge and experience of the Subject Matter Experts, it is suggested 24 hours of learning activities per year are necessary to maintain proficiency in the waste management functional area after completion of the competencies in the Standard and other requirements of the Technical Qualification Program.

LIST OF CONTINUING EDUCATION, TRAINING AND OTHER ACTIVITIES

The supervisor and the employee will determine annually what training will be required for the following year to ensure the individual maintains proficiency in the Waste Management Area.