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Radioactive Waste Characterization, Packaging, and Shipping Criteria Review and Approach Document		
Authorization and Approval	C.E. (Gene) Carpenter, Jr. Director, Office of Nuclear Safety and Environmental Assessments, EA-31 Date: July 26, 2019	Lead, Timothy F. Mengers Nuclear Engineer EA-31 Date: July 26, 2019

1.0 PURPOSE

The mission of the U.S. Department of Energy (DOE) Office of Environment, Safety and Health Assessments (EA-30) is to assess the effectiveness of safety and emergency management systems and practices used by line and contractor organizations and to provide clear, concise, rigorous, and independent evaluation reports of performance in protecting workers, the public, and the environment from the hazards associated with DOE activities.

In addition to the general independent oversight requirements and responsibilities specified in DOE Order (O) 227.1A, *Independent Oversight Program*, this criteria and review approach document (CRAD), in part, fulfills the responsibilities referenced in DOE O 435.1, *Radioactive Waste Management*, Section 5 and assigned to EA in in Section I 2 C of DOE Manual (M) 435.1-1, *Radioactive Waste Management Manual*, to conduct independent appraisals and audits of DOE waste management programs and to review site waste management plans with regard to compliance with DOE environment, safety, and health requirements.

The CRADs are available to DOE line and contractor assessment personnel to aid them in developing effective DOE oversight, contractor self-assessment, and corrective action processes. The current revision of EA's CRADs are available at http://www.energy.gov/ea/criteria-and-review-approach-documents.

2.0 APPLICABILITY

This CRAD is approved for use by assessment teams within the Office of Environment, Safety and Health Assessments, EA-30. This CRAD applies to assessments associated with radioactive waste as defined by the *Atomic Energy Act of 1954* and the *Nuclear Waste Policy Act of 1982*, as amended. This CRAD addresses the directive requirements, processes, and practices used for characterizing and certifying the composition of wastes to assure appropriate disposal in accordance with receiving facility Waste Acceptance Criteria (WAC). This CRAD also addresses the requirements, processes, and practices for packaging and shipping of the wastes to disposal facilities. This CRAD does not address utilization of by-product material as defined by the *Atomic Energy Act of 1954*, as amended, or naturally occurring radioactive material.

3.0 FEEDBACK

Comments and suggestions for improvements on this CRAD can be directed to the Director, Office of Environment, Safety and Health Assessments.

4.0 CRITERIA REVIEW AND APPROACH

The basic principles of an effective radioactive waste management program for DOE operations must accomplish the goals of Federal and State laws and regulations and Government and Department policy. These are reflected in DOE requirements including DOE O 435.1, and by reference with DOE M 435.1-1, as well as DOE O 458.1, *Radiation Protection of the Public and the Environment*. Guidance for implementation of DOE M 435.1-1 is provided in DOE Standard 5002-2017, *Disposal Authorizations and Tank Closure Documentation*, and DOE Guide 435.1-1, *Implementation Guide for use with DOE M 435.1-1*. The basic requirements for packaging and transportation of hazardous materials outside of DOE property are governed by U.S. Department of Transportation (DOT), 49 CFR parts 171, 172, and 173. The DOE supplements these with DOE O 460.1D *Hazardous Materials Packaging and Transportation*, DOE O 460.2A *Department Materials Transportation and Packaging Management*, and DOE M 460.2-1A *Radioactive Material Transportation Practices Manual*. The DOE directives apply to transportation both on public roadways and on DOE properties.

Additional regulations from the Environmental Protection Agency (EPA), and other DOE orders may also be applicable to various DOE radioactive waste management operations. Applicable EPA regulations include portions of the *Resource Conservation and Recovery Act* (RCRA) (40 CFR Parts 239-282) applied to hazardous wastes; *Toxic Substance Control Act* (TSCA) (40 CFR Parts 700-799), which principally address wastes containing PCBs or asbestos; and, the *Comprehensive Environmental Response, Compensation , and Liability Act* (CERCLA) (42 USC 9601). These requirements are implemented through the Federal and State EPA and through various state agreements.

The majority of the criteria identified in this CRAD are drawn directly from DOE M 435.1-1. This CRAD is organized into criteria and lines of inquiry applicable to each area as follows:

- Technical Adequacy of Policy, Directives, and Processes
- Waste Stream Characterization
- Waste Certification and Traceability to Meet WAC
- Packaging and Shipping Procedure Implementation
- Quality Assurance and Oversight

OBJECTIVES

WM.1: Directives and procedures governing characterization, certification, packaging, and transportation of wastes are technically adequate to assure hazards of waste handling, packaging, transportation and disposal are controlled and disposal facility WAC are satisfied.

Criteria:

1. Directive requirements for waste characterization, certification, packaging, and transportation are clearly articulated, and adequately address and control identified hazards.
2. Roles, Responsibilities, Accountabilities, and Authorities within the regulations, directives, and implementing procedures related to waste characterization, certification, packaging, and transportation are clearly identified, up-to-date, and understood by the implementing personnel.
3. Directives and procedures are consistent across the various governing documents, incorporate up to date references, and clearly define applicability, and regulatory interfaces and authorities.
4. High level directives requirements are flowed down to consistent guidance documents and procedures that are implemented in the field.
5 Appropriate feedback and change control processes are implemented to ensure requirements are modified in response to operating experience and changing conditions, and changes are implemented in the field in a timely manner.

<u>Additional Considerations</u>

- Based on operating experience do the existing directives adequately address identified hazards?
- Are the roles, responsivities, authorities and accountabilities within the regulations, directives, and implementing procedures for waste characterization, certification, packaging, and transportation clearly identified, up-to-date, and implemented as written?
- Are requirements consistent across the existing directives?
- Are references within the directives up to date?
- Are regulatory interfaces clearly defined and are requirements implemented consistently in the field?
- Are directives requirements adequately flowed into consistent guidance documents and implementing procedures?
- Are directives and procedural requirements consistently implemented and followed in the field?
- Are feedback and change control process effectively implemented?
- Are any changes in directives requirements currently under development? If yes, what are the anticipated focus areas, and what are the anticipated schedules for the changes?

WM.2: Low-level waste shall be characterized using direct or indirect methods, and programs and procedures are in place and adequately implemented to ensure that the characterization is documented in sufficient detail to ensure safe management and compliance with the waste acceptance requirements of the facility receiving the waste.

Criteria:

1. The facility has established processes that assure hazardous and radioactive waste streams are properly identified and characterized.
2. Processes incorporate appropriate levels of measurement, analysis, and documentation. Measurement and analysis is conducted using established, and effective calibration, instrument maintenance, and measurement quality control processes.
3. Data quality objectives processes are used for identifying characterization parameters and acceptable uncertainty in characterization data. Measurement and analysis procedures clearly define acceptance criteria and response actions for non-conforming results.
4. Characterization, at a minimum, includes the following information:

    - Physical and chemical characteristics;
    - Volume, including the waste and any stabilization or absorbent media;
    - Weight of the container and contents;
    - Identities, activities, and concentrations of major radionuclides;
    - Characterization date;
    - Generating source;
    - Any other information which may be needed to prepare and maintain the disposal facility performance assessment, or demonstrate compliance with applicable performance objectives.

Additional Considerations

- Is there sufficient data to clearly identify any hazardous characteristics including chemical reactivity or physical hazards that may degrade the ability of waste packages to perform their radioactive waste management and safety functions?
- Is there sufficient data to support determinations that the waste satisfies the disposal facility WAC?
- Are effective processes in place to accurately characterize waste stream constituents and hazards?
- Do characterization measurement and analysis processes effectively address all critical characteristics of the WAC?
- Do waste characterization programs take into account decay and ingrowth of radionuclides?
- Do waste characterization programs take into account radiolytic decomposition of other waste items, such as plastic bags decomposing to form flammable gases?
- Are appropriate controls in place to identify, assess, monitor, and control RCRA and TSCA regulated mixed wastes?
- Are appropriate test methods, assays, and/or acceptable knowledge documentation used to characterize the waste streams?
- Are appropriate data quality objectives and limitations identified in the sampling and analysis plans, procedures, and measurement documentation?
- Are calibration and measurement quality control processes adequately implemented and documented for all test equipment?

- Does characterization data, include: physical and chemical characteristics; presence or absence of prohibited items (pressurized gases, free liquids, characteristic hazardous materials, reactive materials); volume, including any solidification, stabilization or absorbent material; identities, activities, and concentrations of radionuclides and specific chemicals of concern, e.g., chlorinated solvents; characterization date; generating source?
- Are processes effectively implemented to assure changes in waste stream constituents or anomalies in measurements are identified and analyzed?
- Are scaling factors used to determine concentrations or activity based on indirect measurements fully supported by documented analysis?
- When historic process information or acceptable knowledge (AK) is used as a basis to determine waste characterization, are adequate quality assurance (QA) verification or measurement processes used to identify anomalies?
- Are assumptions and potential variables associated with "Acceptable Knowledge" or "Process Knowledge" determinations evaluated to assure unanalyzed hazards or conditions that would violate the WAC, associated waste profiles, safe handling controls, or data quality objectives are prevented?
- Are change control processes implemented for modification in the characterization procedures and/or measurement and test equipment?
- Are periodic quality control or validation measurements and analysis performed to identify changes in the waste streams that could impact the initial waste characterizations and compliance with waste stream profiles?
- Are personnel involved with characterization appropriately trained and authorized to perform their assigned responsibilities?
- Are laboratories and measurement systems used for characterization properly accredited and do they use traceable reference standards for measurements?
- Are the radioactive waste stream hazards managed in a manner that protects facility workers, co-located workers, the public, and the environment, and meets the waste management requirements of DOE directives, EPA, DOT, and State and local regulations?
- Does the physical, chemical, and radiological characteristics of the waste at each phase of the Monitoring and assessment of radioactive waste management process assure conformance with the WAC and safe handling requirements?

WM.3: Programs and procedures are in place and adequately implemented to ensure that: Waste packages or bulk shipments do not contain unanalyzed and uncontrolled hazards; wastes are packaged in conformance to the disposal facility WAC and reviewed and approved waste profiles; waste stream characterization data and packaging activity monitoring data verify conformance with the WAC and reviewed and approved waste profiles.

Criteria:

1. Generator facilities maintain waste stream profiles that are reviewed and approved by the disposal facilities, and adequately describe the specific waste streams, limitations, and packaging requirements.
2. Generator facilities adequately implement processes to monitor waste packaging or bulk shipment activities assuring conformance to the waste stream profiles.
3. Generator facilities adequately implement processes to assure traceability of waste packages or bulk shipments to the characterization data and packaging activity monitoring data.
4. Generator facilities maintain processes to certify that waste packages or bulk shipments conform to the waste profiles and WAC prior to shipment to the disposal facility.

Additional Considerations:

- Do established waste profiles adequately describe the current generator waste streams?
- Are waste profiles complete, accurate, and up to date with respect to waste stream limitations and the current facility WAC?
- Are effective change control processes implemented to address changes in waste stream characterization, disposal facility WAC, waste profile limitations, and packaging or monitoring practices?
- Do monitoring, testing, and assay processes include appropriate methods to detect hazardous waste constituents, potential incompatibilities of the wastes constituents, and characteristics that could adversely impact the health and safety of the workers, impact facility operations, degrade the integrity of waste containers, or impact the long term stability of the disposal facility?
- Do waste packaging activity monitoring processes such as visual inspection, RTR, assays, or sampling adequately measure or address all limitations in the waste stream profiles and WAC? If not, what is the basis for determining acceptability of the waste packages?
- Are limitations and acceptance criteria for monitoring results clearly identified and communicated to the appropriate personnel?
- Do processes include mechanisms to identify anomalous or non-conforming results and instructions for response?
- Are waste package content inventories appropriately and accurately scaled or adjusted based on monitoring measurements such as weight, volume, dose rate surveys, or chemical assays?
- Do waste packaging processes prevent mixing or comingling of non-compatible wastes or waste streams?
- Do waste packaging processes assure documented traceability of specific packages to the identifiable waste generator facility or work, and the characterization and packaging monitoring data?
- Are personnel involved with packaging, monitoring, and certifying wastes appropriately trained and authorized to perform their duties?
- Are personnel involved with packaging, monitoring, and certifying wastes knowledgeable of the limitations and restrictions of each waste profile and the capabilities or accuracies of the monitoring and inspection processes?
- Is a documented and approved certification process established and effectively implemented prior to transfer of wastes that satisfies the requirements of the DOE M 435.1?
- Are wastes offered for transport certified as conforming to the WAC and profile limitations by trained and authorized certifiers based on documented characterization and monitoring data?
- Is characterization, monitoring, and certification data maintained and archived in accordance with established procedures for auditability, retrievability, and specified records retention periods

WM.4: Radioactive waste shall be packaged and transported in accordance with DOE O 460.1A*, Packaging and Transportation Safety*, and DOE O 460.2, *Departmental Materials Transportation and Packaging Management,* using adequate packaging, placarding, marking, and labeling, and means of transport, as well as proper documentation as prescribed by applicable EPA, DOT, DOE, and State regulatory programs). This includes adherence to DOT regulations (see 49 CFR 171 through 173) or site-specific procedures providing equivalent measures of safety when transporting materials classified as hazardous materials within site boundaries.

Criteria:

1. Packaging: Wastes are contained in a manner that prevents release or distribution under conditions reasonably anticipated during transportation. Wastes prepared for transportation are packaged in accordance with applicable DOT or site transportation requirements. Waste packaging conforms to the applicable DOT package types and Certificates of Compliance, or for on-site transport, a locally approved equivalent. (See 49 CFR §173.410 – 440.)
2. Transport Classification: Wastes are classified appropriately in accordance with DOT 173.1 (typically Class 7 radioactive materials with appropriate subsidiary classifications).
3. Labeling: Wastes containers are labeled in accordance with the applicable DOT or site requirements based on the classifications, package types, specific activities, dose rates, waste forms, and other contents. Typically this will include a C**lass 7 radioactive material label, but may also include applicable labeling for subsidiary hazards such as corrosives or reactives if the waste is designated for a RCRA or CERCLA disposal facility or other pretreatment facility.**
4. Placarding: Transport vehicles are appropriately placarded in accordance with applicable requirements based on the waste characteristics.
5. Monitoring: Waste container and transport vehicles are monitored for accessible contamination prior to shipments and levels are verified to conform to applicable limits in 49 CFR 173. Levels are verified to conform to the appropriate limitations considering the type of packaging, transport vehicle, and route controls. Transport vehicles and packages are monitored for radiation levels and contamination upon receipt. Empty vehicles are monitored for radiation levels and contamination prior to release. Processes are in place to identify and respond to variations between pre and post shipment monitoring results, non-conformance with the radiation and contamination limitations for the type of shipment, or issues with the release of the empty transport vehicles or containers.
6. Manifests and Documentation: Shipment manifests, package labeling, and supporting documentation are accurate. Records are properly reviewed, approved, and archived in accordance with established procedures. Shipping documentation includes appropriate emergency response or off normal condition instructions to the drivers including contact and support information.
7. Training and Authorizations: Personnel involved with the monitoring, certification, packaging, labeling, placarding, manifest document preparation and transport are trained and qualified for the assigned duties.
8. Route control and security plans: Where applicable, appropriate route control plans and transportation security plans are implemented.

Additional Consideration

- Do packaging and staging practices adequately consider the time period and conditions for storage prior to shipment and potential for package degradation, radioactive material decay or ingrowth, pressurization, or constituent reactivity?
- Do waste packages conform to the appropriate DOT requirements for package type and integrity?

- Do the shipping organizations have documentation of the testing, certification, and QA of the packages?
- Does the available package documentation include results of QA testing and verification prior to and during loading operations? (Specifically applicable to Type B containers and others that require a Certificate of Compliance)
- Do waste shipments off-site conform to DOT requirements?
- Are DOT requirements applied to on-site transfers of waste between facilities? If not, what are the differences, and do they provide an equivalent level of safety and control of the material?
- Are waste packages properly labeled?
- Are waste transport vehicles properly placarded?
- Are adequate surveys of waste containers and shipment transport vehicles conducted, documented and reviewed prior to release of each shipment? Are pre and post shipment measurements compared and discrepancies addressed?
- Are shipment monitoring results consistent with waste characterization and certification information?
- Are adequate receipt surveys of shipments conducted, reviewed, and documented? Are these consistent with the surveillances performed prior to transportation? Is there an effective process for responding to non-conforming shipments?
- Are adequate clearance surveys conducted on empty transport vehicles prior to loading and following off-loading? Is a process established to respond to residual contamination or increased radiation levels?
- Are effective emergency notification and response procedures established for transportation incidents?
- Are manifests properly prepared for waste shipments?
- Are shipping manifests consistent with package characterization and WAC certification documentation?
- Do manifests accurately reflect pre-and post-shipment monitoring and measurement records and results?
- Do manifests include appropriate transportation incident emergency notifications and response instructions?
- Are all individuals associated with packaging, shipment surveillance, and transport properly trained and re-trained in accordance with DOT requirements?
- Are manifests signed by trained and authorized agents of the shipper?
- Are transportation details including waste certification, and transport schedules coordinated with the receiving facility prior to release for transport?

WM.5: Headquarters program office, site offices and operating contractors implement effective audit and oversight processes to verify the safety of radioactive waste processes and assure the quality of work performed for waste characterization, certification, packaging and shipping.

Waste Generator Contractor Quality Assurance

Criteria:

1. The waste generator contractor maintains an effective audit and QA program to verify the adequacy of waste characterization processes.
2. The waste generator contractor maintains an effective audit and QA program to verify wastes are packaged in accordance with WAC and reviewed and approved waste profiles.
3. The waste generator contractor maintains an effective audit and QA process to verify wastes shipments conform to the applicable DOT regulations and DOE transportation directives.

4. The waste generator contractor maintains effective feedback and improvement and issues management processes to address issues and weaknesses identified by the QA and audit processes.

Additional Considerations

- Does the waste generator contractor implement a documented audit and QA program?
- How frequently have waste characterization, certification, and packaging processes been reviewed or audited?
- What audit criteria or lines of inquiry are used?
- How are audit personnel selected and trained or qualified for the specific subject expertise?
- Have any non-conformance or weaknesses with waste characterization, certification, and packaging been identified in the last five years?
- How are non-conformances or weaknesses with waste characterization, certification, and packaging identified and reported?
- What if any Causal Analysis and Corrective Action Plans related to waste characterization, certification, and packaging processes have been developed in the last five years? How were they implemented and verified to be effective?
- What if any external lessons learned or operating experience reviews have been used to improve waste characterization, certification, and packaging processes?

Disposal Facility Contractor Quality Assurance

Criteria:

1. The disposal facility contractor maintains an effective review and acceptance process for waste profile proposals from the generator facilities.
2. The disposal facility contractor maintains an effective review process to assure profiles are kept up to date and consistent with the generator waste streams.
3. The disposal facility contractor maintains an effective audit process that verifies the adequacy and accuracy of the generator's waste characterization processes.
4. The disposal facility contractor maintains an effective audit process that verifies the adequacy of the generator's waste packaging and certification processes.
5. The disposal facility contractor utilizes appropriate methods such as review of generator facility data and documentation, direct non-destructive assay measurements, and/or periodic or random sampling to verify conformance to the WAC, waste profiles, and shipping regulations.
6. The disposal facility contractor maintains effective feedback and improvement and issues management processes to assure weaknesses and non-conformances are identified and addressed.

Additional Considerations

- Does the disposal facility contractor maintain a documented and effective waste profile proposal review and approval process that verifies conformance to the WAC?
- Does the waste profile review and approval process include periodic reevaluation and reaffirmation of existing profiles? If yes, how are these reevaluations performed?
- How frequently are the generator facility characterization and certification processes audited?
- How are topical assessment areas, target waste stream profiles, and lines of inquiry for the audits selected?
- How are the audit team members and subject matter experts (SMEs) selected and qualified for the specific topical areas?

- How does the receiving facility verify individual shipments or packages conform to the WAC and waste profiles?
- How are non-compliant waste packages dispositioned?
- Have any non-conformance with the waste profiles, WAC, or shipping requirements been identified in the last five years? If yes, how were they identified? How were they reported, addressed, and corrected?
- What if any Causal Analysis and Corrective Action Plans related to WAC, waste profile or shipping nonconformances have been developed in the last five years? How were they implemented and verified to be effective?
- What if any external lessons learned or operating experience reviews have been used to improve processes or verification of conformance to the requirements?

Headquarters and Field Element Oversight

Criteria:

1. DOE line management has established and implemented effective oversight processes that evaluate the adequacy and effectiveness of the contractor's radioactive waste management program. (DOE O 226.1B)
2. DOE line management maintains sufficient technical capability and knowledge of site and contractor activities to make informed decisions about hazards, risks, and resource allocation; provide direction to contractors; and evaluate contractor performance. (DOE O 226.1B)
3. Site Office Oversight Program: Oversight processes are tailored according to the effectiveness of contractor assurance systems, the hazards at the site/activity, and the degree of risk, giving additional emphasis to potentially high consequence radioactive waste management activities.
4. Facility Representatives (FRs): FRs provide effective routine operational awareness to determine that the contractor is operating DOE facilities in a safe manner.
5. Safety System and Safety Management Program Oversight: The DOE field element has established and implemented effective processes using safety system oversight (SSO) and SMEs in formal assessments and routine operational awareness activities (or comparable processes involving appropriately qualified FRs) to apply engineering and/or discipline specific expertise in its oversight of the assigned safety systems, to monitor performance of the contractor's cognizant system engineer (CSE) programs, and to provide assessment and oversight of the safety basis, and associated safety management programs.

Additional Consideration:

- Does the DOE field element oversight program include written plans and schedules for planned assessments, focus areas for operational oversight, and reviews of the contractor's self-assessment of processes for structures, systems, and components, (SSCs) and safety management programs (SMPs)?
- Does the DOE field element have an effective issues management process that is capable of categorizing findings based on risk and priority; ensuring relevant line management findings are effectively communicated to the contractor; ensuring that problems are elevated and effectively corrected in a timely manner; and lessons learned are disseminated to address extent of condition issues?
- Does the DOE field element maintain adequate technical capabilities (either onsite or through agreements with headquarters, integrated service centers, or independent support contractors) to perform oversight and contractor performance evaluations with respect to all safety class and safety significant systems and safety management programs as required by applicable DOE orders?

- Does the field element perform adequate independent evaluation and verification of contractor performance?
- Are FRs well-trained and qualified according to an established facility training and qualification program?
- Is there adequate FR coverage for the facilities?
- Are FRs performing facility assessments, surveillances, and reviews as scheduled and are the findings meaningful and consistent with facility performance?
- Are FRs documenting operational awareness activities regularly and in accordance with implementing procedures?
- Are FRs reviewing occurrence reports in a timely manner and ensuring that the root cause has been accurately determined and effective corrective action proposed and implemented?
- Are FRs and safety basis reviewers provided guidance and appropriate training for recognition of issues where SSO or SME consultation or integration into assessment and oversight is necessary?
- Are SSOs and SMEs well-trained and qualified according to an established site and facility training and qualifications programs?
- Is there adequate SSO and SME coverage and familiarity of the facilities systems and programs and procedures?
- Do SME personnel periodically assess the contractor's programs?
- Are sufficient independent assessments performed to verify contractor performance?
- Do site office oversight activities ensure adequate recognition, control, and protection from long term risks and DOE liabilities?

REVIEW APPROACH

The following provides an overview of the typical activities that will be performed to collect information to evaluate the management of radioactive wastes.

Record Reviews:
Review radioactive waste management and control policies and implementing procedures. Review site, project, or facility policies, procedures, and corresponding waste management documentation related to Integrated Safety Management (ISM) core function and nuclear safety implementation. The specific documents or procedures will vary depending on the facility type or activities assessed. The following is a generic list of typical documents which may be reviewed, including both contractor and DOE field office documents.

Generator Contractor Documents:

- Waste Certification Program Plan
- Waste QA Plan
- WAC implementation crosswalk
- Active Waste Profiles and documentation on recent changes or modifications (sample)
- Waste Certification Officials personnel listings
- Records of training and qualification for waste characterization, certification, packaging, and shipping personnel
- Radioactive waste characterization, packaging and shipping procedures
- Radioactive Waste Transportation Plan(s), shipping manifests and procedures (sample)
- Documentation of results from Federal site office or DOE-HQ program office assessments
- Documentation of results from disposal facility team audits

- Documentation of any issues, non-conformances, causal analysis, and corrective actions related to radioactive waste stream characterization, certification, packaging, packaging, and shipping over the last five years
- Organizational charts showing all levels of staff involved in handling or processing radioactive wastes, characterization of waste streams, and certification of WAC compliance, packaging, transportation, assay or analysis, and disposal of radioactive wastes

Disposal Facility Documents:

- Organizational charts showing all levels of staff involved in waste profile review and approval, generator facility audits, WAC compliance reviews, waste receiving and acceptance, package monitoring, assays or analysis, and disposal of radioactive wastes
- Records of training and qualification for personnel
- Disposal Facility WAC
- Procedures for review and approval of waste profiles
- Documentation of recent waste profile review and approval activities
- Procedures for audit processes
- Example audit plans and lines of inquiry
- Example generator facility audit reports
- Procedures for Feedback and Improvement and Issues Management programs
- Documentation of corrective actions or follow-up to issues or deficiencies identified during generator audits
- Lists of identified non-conformance of to the WAC, waste profiles, or shipping requirements over the last five years
- Example documentation of the causal analysis and corrective actions taken to address identified non-conformances.

DOE Headquarters and Site Office Documents:

- Site Office organization chart
- Oversight Program implementing plans, procedures, and instructions/guidance, (including subordinate program and activity requirements documents, readiness reviews, contract performance evaluations, self-assessments, and issues management programs)
- Examples of recent documents communicating the results of field element oversight results concerning radioactive waste management (e.g., periodic reports from the Facility Representative and/or subject matter expert (SME) walk-downs and reviews, issues, and findings transmitted to the contractor)
- List of corrective actions implemented by the contractor as a result of field element oversight of the contractor's management of radioactive wastes
- Site Office assessment plans and schedules for the past three years and the current fiscal year at the selected facility
- List of assessments (including internal self-assessments and external program reviews) performed in the last three years involving the contractor's management of radioactive wastes
- Lists of deficiencies, findings, observations, etc. associated with the management of radioactive materials and waste identified by the Site Office within the past three years
- Copy of last two Site Office or support center oversight assessments involving the contractor's management of radioactive materials and waste

Interviews:

Interview personnel including: those responsible for waste management oversight and supervision, subject matter experts, and implementing staff. The specific personnel interviewed will vary depending on the facility type or activities assessed. The following is a generic list of types of positions a sample of personnel will be chosen from to be interviewed:

- Headquarters SME for Radioactive Waste Management
- Site Office SME for Radioactive Waste Management
- Facility Representatives
- Waste Management Program Manager
- Waste Management Program Supervisors
- Waste Management Personnel
- Transportation Personnel
- Non-destructive assay personnel
- Training Personnel

Observations:

Perform facility/building walkdowns and inspections, and observe selected work activities, such as waste stream characterization measurements, waste package QA measurement, visual inspections and assays, waste packaging, shipping, shipment receipt and acceptance.

- Facility operational demonstrations
- Facility, building, and laboratory walk downs and reviews
- Waste characterization activities including non-destructive assay
- Waste handling and packaging activities
- Waste container shipping activities including loading/unloading operations
- Operational demonstration of waste disposal activities

Appendix A

Acronyms used in this document:

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CRAD	Criteria and Review Approach Document
CSE	Cognizant System Engineer
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EA	Office of Enterprise Assessments
EM HQ	Office of Environmental Management Headquarters
EPA	U.S. Environmental Protection Agency
FR	Facility Representative
ISM	Integrated Safety Management
PCBs	Polychlorinated Biphenyls
RCRA	Resource Conservation and Recovery Act
SME	Subject Matter Expert
SMPs	Safety Management Programs
SSCs	Structures, Systems, and Components
SSO	Safety System Oversight
TSCA	Toxic Substance Control Act
WAC	Waste Acceptance Criteria