ORNL/ER-288

MARTIN MARIETTA

ENVIRONMENTAL RESTORATION PROGRAM

Waste Management/Waste Certification Plan for the Oak Ridge National Laboratory Environmental Restoration Program

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FOR THE UNITED STATES
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Energy Systems Environmental Restoration Program
ORNL Environmental Restoration Program

Waste Management/Waste Certification Plan for the Oak Ridge National Laboratory Environmental Restoration Program

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Waste Management/Waste Certification Plan for the ORNL Environmental Restoration Plan

ORNL/ER-288

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PREFACE

The preparation of this Waste Management and Certification Plan is to meet the intent of Martin Marietta Energy Systems, Inc. (Energy Systems) and the Department of Energy in streamlining the amount of documentation and review time required for environmental restoration remediation, site investigations, preliminary assessments, and decontamination and decommissioning projects. In addition, the Environmental Restoration Program is meeting a directive of Energy Systems Waste Management Organization that calls for Oak Ridge National Laboratory Engineering Project Waste Certification Procedures to be final on March 10, 1995.

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ABBREVIATIONS

ALARA	as low as reasonably achievable
AOC	area of contamination
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CH	contact handled
CPL	container packing list
CPM	counts per minute
CSL	Close Support Laboratory
CWA	Clean Water Act
D&D	decontamination and decommission
DOE	Department of Energy
DOT	Department of Transportation
DPM	disintegrations per minute
EDT	Explosive Detonation Trench
EPA	Environmental Protection Agency
ER	Environmental Restoration (Program)
ES&H	environmental safety and health
ESWMO	Energy Systems Waste Management Organization
EWB	Emergency Water Basin
HRE	Homogeneous Reactor Experiment
IDW	investigation derived waste
LLW	low-level waste
LLLW	liquid low-level waste
NCP	National Contingency Plan
NHF	New Hydrofracture Facility
OHF	Old Hydrofracture Facility
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OSWER	Office of Solid Waste and Emergency Response
PCB	polychlorinated biphenyl
PPE	personal protective equipment
PPM	parts per million
QA	quality assurance
RCRA	Resource Conservation and Recovery Act
RFD	Request for Disposal
RI	remedial investigation
RSWO	Radioactive Solid Waste Operations
SLLW	solid low-level waste
SWMU	solid waste management unit
SWSA	solid waste storage area
TMIS	Training Management Information System
TRU	transuranic
TSCA	Toxic Substance Control Act
TSD	treatment, storage, and disposal

UST	underground storage tank
WAC	Waste Acceptance Criteria
WAG	waste area grouping
WC	waste certifier
WCA	waste consolidation area
WCG	Waste Certification Group
WCP	Waste Certification Procedure
WID	Waste Item Description
WM	waste management
WMO	Waste Management Organization
WMOG	Waste Management Operations Group
WM/WCP	Waste Management/Waste Certification Plan
WPR	Waste Pickup Request

DEFINITIONS

Area of contamination (AOC)—An AOC is delineated by the areal extent (or boundary) of contiguous contamination. Such contamination must be continuous but may contain varying types and concentrations of hazardous substances. Depending on site characteristics, one or more AOCs may be delineated (OSWER Directive No. 9347.3-05 FS).

Absorption—Liquid enters the volume of the absorbing medium by either physical or chemical means, such as capillary or hydration.

Adsorption—Liquid adheres to the surface of the adsorbing medium.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)—As amended by the Superfund Amendments and Reauthorization Act of 1986.

Contact handled solid low-level waste (SLLW)—Packaged waste with an unshielded container surface radiation exposure equivalent rate of ≤200 mrem/h. Contact handled waste is divided into two categories: compactible and noncompactible.

Container packing list form (#UCN 20300)—This form is used to describe a single standard shipping/storage container that holds multiple, separately identified waste items. The container packing list records the type and identity of the standard shipping/storage container, the identities of all of the waste items packed inside the container, and any applicable handling information.

Decontamination fluids/agents—Water, solvents, or other fluids and abrasive material (aluminum silicate) used to decontaminate equipment and instruments and nondisposable personal protective equipment.

Dewatered—Process of removing water from waste forms such as sludge, sediment, etc.

Disposable equipment—Equipment that is difficult to decontaminate but inexpensive enough to be discarded following use.

Drilling mud (or drilling fluid)— A carefully formulated heavy suspension, usually in water but sometimes in oil, used in rotary drilling. It commonly consists of bentonitic clays, chemical additives, and weighing materials such as barite. It is pumped continuously down the drill pipe, out through the openings in the drill bit, and back up into the annulus between the pipe and the walls of the hole to a surface pit where it is screened and reintroduced through the mud pump. The mud lubricates and cools the bit, carries the cuttings up from the bottom, and prevents blowouts and cave-ins by plastering friable or porous formations and maintaining a hydrostatic pressure in the boreholes offsetting pressures of fluids that may exit in the formation.

Encapsulation—To cover and surround an object with solidification agent.

Environmental Restoration (ER) Program—The program responsible for the identification, characterization, decommissioning and decontamination, and remediation of sites, spill sites, and other orphaned areas or facilities that either are affecting or have the potential to affect public health and safety or the environment. As the generator of potentially large volumes of waste over the next several decades, the ER Program is responsible for ensuring the safe and regulatory-compliant management of its wastes.

Feasibility study—A study to develop and evaluate options for remedial action. The feasibility study emphasizes data analysis and is generally performed concurrently and in an interactive fashion with the remedial investigation using data gathered during the remedial investigation. The remedial investigation data are used to define the objectives of the response action alternatives and to undertake an initial screening and detailed analysis of the alternatives.

Field staging area—An area within the area of contamination where drums and other containers of waste are stored until the site investigation activities are completed, a final disposal option is selected in a Record of Decision (ROD), or until characterization data are returned from the laboratory so that the waste may be transferred to Waste Management Operations. This area may be used until appropriate disposition of all containers is completed consistent with the ROD. The location is usually near the point of waste generation, where the containerized waste materials are staged before the waste is transferred to Oak Ridge National Laboratory (ORNL) Waste Operations.

Free liquids—Liquids that readily separate from the solid portion of a waste under ambient temperature and pressure.

Generator—Individual whose act or process produces waste.

Groundwater—Water in a saturated zone or stratum beneath the surface of land. (40 *CFR* 300.5).

Hazardous waste—Any discarded solid, liquid, or gaseous material that meets the definitions of reactivity, corrosivity, ignitability, or toxicity as defined in 40 *CFR* 261 Subpart C or is an U.S. Environmental Protection Agency- (EPA-) listed hazardous waste in 40 *CFR* 261 Subpart D.

Hazardous substance—Any substance designated pursuant to Sect. 311(b)(2)(A) of the Clean Water Act (CWA); any element, compound, mixture, solution, or substance designated pursuant to Sect. 102 of CERCLA; any hazardous waste with the characteristics identified under or listed pursuant to Sect. 3001 of the Solid Waste Disposal Act (but not including any waste for which regulation under the Solid Waste Disposal Act has been suspended by Act of Congress); any toxic pollutant listed under Sect. 307(a) of CWA; any hazardous air pollutant listed under Sect. 112 of the Clean Air Act; and any imminently hazardous chemical substance or mixture with respect to which the EPA Administrator has taken action pursuant to Sect. 7 of the Toxic Substances Control Act. The term does not involve petroleum, including crude oil or any fraction thereof, which is not otherwise specifically listed or designated as a hazardous substance in the first sentence of this paragraph, and the term does not include natural gas, natural gas liquids, liquified natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas). [See 49 *CFR* 171.8 for U.S. Department of Transportation- (DOT-) specific definition.

High-level waste—Highly radioactive waste material that results from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid waste derived from the liquid that contains a combination of transuranic (TRU) waste and fission products in concentrations requiring permanent isolation (DOE Order 5820.2A).

Interim status storage area—A facility or area that is permitted to store hazardous waste under RCRA Part A permit.

Investigation derived waste (IDW)—Waste generated during preliminary assessment/site investigations, remedial investigations/feasibility studies, and remedial designs that may pose a risk to human health and/or the environment. IDW may include contaminated personal protective equipment; solutions (aqueous or abrasive materials) used to decontaminate nondisposable protective clothing and equipment; drilling mud, cuttings, and purge water from test pit and well installation; soil and other materials from collection of samples; and residues (e.g., ash, spent carbon, well development purge water) from testing of treatment technologies and pump and treat systems, etc.

Low-level radioactive waste (LLW)-Waste that contains radioactivity but is not classified as high-level waste, transuranic waste, spent nuclear fuel, or byproduct material as defined by DOE Order 5820.2A. LLW does not contain hazardous waste as defined in 40 *CFR* 261 or materials regulated under the Toxic Substance Control Act (TSCA).

Mixed waste—Any combination of radioactive and Resource Conservation and Recovery Act (RCRA) wastes.

National Contingency Plan (NCP)—The NCP was written to implement Sect. 105 of CERCLA as amended by Superfund Amendments and Reauthorization Act and CWA Sect. 311(c)(2), and it provides a method of response under those sections. The NCP stipulates that no federal, state, or local permits are required for on-site response actions conducted pursuant to CERCLA Sects. 104, 106, 120, 121, or 122. The term on-site means the areal extent of contamination of all suitable areas in close proximity to the contamination necessary for implementation of the response action.

Off-site shipments (CERCLA)—Those shipments made outside the U.S. Department of Energy- (DOE-) owned or leased property, where no specific DOE or DOE contractor controls are in effect; and, used in this procedure, any shipments that are transported outside the plant's site perimeter security fence.

Off-site (RCRA)—The opposite of on-site under RCRA.

On-site (RCRA)—Any property that is not the same or geographically contiguous property that may be divided by public or private right-of-way, provided the entrance and exit between the properties is at a cross-roads intersection, and access is by crossing as opposed to going along, the right of way. Noncontiguous properties owned by the same person but connected by a right-of-way that (s)he controls and to which the public does not have access is also considered on-site property.

On-site movement—Transportation made wholly within the boundaries of the main plant site perimeter security fence or movement from contiguous AOCs directly back onto the plant site when it is only necessary to cross a public road to accomplish the transportation.

On-site treatment, storage, and disposal (TSD) (CERCLA)—RCRA Interim Status, permit-by-rule, or permitted TSD facilities (e.g., wastewater treatment units, sanitary landfills, TSCA Incinerator, hazardous waste storage warehouse) located within fenced plant boundaries at ORNL, K-25 Site, or the Y-12 Plant.

Oak Ridge Reservation (ORR) CERCLA Site—The ORR was placed on the CERCLA National Priorities List on November 21, 1989. The entire 35,000 acre reservation is considered a CERCLA site.

Permitted storage area—A facility or area where RCRA-hazardous waste may be stored under a RCRA Part A or Part B permit.

Personal protective equipment—Equipment used to protect personnel who conduct activities in contaminated areas, including items such as coveralls, boots, hard-hats, gloves, respirators, safety glasses, and self-contained breathing apparatus, etc.

Preliminary assessment—A review of existing information and/or site investigation to determine whether contamination is present.

Process knowledge—As it applies to waste certification, documented knowledge of the source, constituents, and processes associated with a waste that allows a reliable estimation of the components and component quantities in waste from a specific waste stream. The applicability of process knowledge must be validated on a periodic basis.

Project site—A property or facility designated for site investigation or remedial investigation under the Martin Marietta Energy Systems, Inc. (Energy Systems) ER Program.

Project manager—The person responsible for the management of all aspects of the project.

Proper shipping name—The name of a hazardous material shown in 49 *CFR* 172.101.

Publicly owned treatment works (POTWs)—Any device or system used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature that is owned by a state or municipality. This definition includes sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment (40 *CFR* 122.2 and 40 *CFR* 260.10).

Radioactive waste—Solid, liquid, or gaseous material that (1) contains radionuclides regulated by the Atomic Energy Commission of 1954, as amended and (2) is of negligible economic value considering cost of recovery.

Radioactive material—Any material (as defined by DOT) for shipping purposes with a specific activity greater than 0.002 μCi/g (or μCi/mL for liquids).

RCRA waste—Any waste or combination of wastes classified as hazardous by RCRA. Hazardous wastes are either listed in 40 *CFR* 261 Subpart D or have characteristics (i.e., ignitability, corrosivity, reactivity, toxicity) identified in 40 *CFR* 261 Subpart C.

Remedial investigation—A process undertaken to determine the nature and extent of the contamination or the release of hazardous substances, pollutants, or contaminants. The

remedial investigation emphasizes data collection and site characterization and is generally performed concurrently and in an interactive fashion with the feasibility study. The remedial investigation includes sampling and monitoring, as necessary, for remedial action and in support of evaluation of remedial alternatives (40 *CFR* 300.5).

Reportable quantity—Quantities of hazardous materials that may be harmful to human health and the environment, as set forth in 49 *CFR* 117.3 and 49 *CFR* 172.101. Transportation or discharge of designated hazardous substances in quantities equal to or greater than the reportable quantities requires compliance with certain DOT or EPA regulations.

Request for Disposal form (UCN-20299)—Energy Systems Uniform Request For Disposal Form Set. Used to document contents of waste designated for disposal.

Sanitary/industrial waste—Waste that is not RCRA hazardous; contains less than 2 ppm polychlorinated biphenyl (PCB); and is not LLW, high-level radioactive, or TRU waste. This waste category generally includes such materials as garbage, refuse, rubbish, paper, wood, nominal amounts of metal, construction materials, and demolition materials.

Satellite accumulation areas—Hazardous waste accumulation points located at or near the point of generation where waste is initially accumulated. Satellite areas are used to collect no more than a total of 55 gal of hazardous waste or no more than 1 quart of acutely hazardous waste (P- and certain F-listed wastes).

90-d accumulation area—An area that is designed according to specifications established by RCRA regulations to store RCRA hazardous waste for a period of up to 90 d. Before the end of the 90 d, a container of RCRA hazardous waste, not defined as IDW, must be transferred to a permitted RCRA TSD Facility.

Shipping paper—A shipping order, bill of lading, manifest, or other shipping document serving a similar purpose and containing information required by 49 *CFR* 172.202, 172.203, and 172.204.

Site inspection—An on-site investigation to determine whether there is a release or potential release of hazardous substances, pollutants, or contaminants and to determine the nature of the associated threats to public health or welfare of the environment. The purpose is to augment the data collected in the preliminary assessment and to generate, if necessary, sampling data and other field data to determine if further action or investigation is appropriate (40 *CFR* 300.5).

Slurry wastes—Liquid radioactive wastes of high insoluble content (greater than 0.1% solid by weight).

Solidification agent—Material that when mixed in prescribed proportions with waste can form a freestanding product with no free liquid.

Solidify—To immobilize by a method that converts a liquid or slurry to a solid. The immobilized substance shall be monolithic with a definite volume and shape, bounded by a stable surface of distinct outline on all sides (free standing).

Spent material—Any material that has been used and because of contamination, can no longer serve the purpose for which it was produced without processing [40 *CFR* 261.1(c)(1)].

Staging area—Area used to store liquid and solid waste before transfer to ORNL waste management for TSD. Area can also be used for other activities affiliated with ER activities.

Subsurface contamination—Contamination that is generally defined as contamination below the first 6 in. of soil.

Transuranic waste—Radioactive waste contaminated with alpha emitting transuranic radionuclides (atomic number >92) with half-lives greater than 20 years and concentrations >100 nCi/g at the time of assay. Additional radioisotopes that are managed as TRU waste at ORNL include ^{252}Cf, ^{244}Cm, and ^{233}U. TRU waste shall be segregated from solid LLW.

Toxic Substances Control Act waste—Waste with a PCB concentration of 2 ppm or greater. Although waste containing PCBs at concentrations less than 50 ppm is not federally regulated, Energy Systems regulates handling of waste containing PCBs at 2 ppm or greater. Therefore, TSCA waste will include all waste containing a PCB concentration of 2 ppm or greater. Asbestos wastes are also regulated under TSCA.

Validation—Activities performed by the generator to confirm the accuracy of the waste characteristics. Validation can be accomplished by assessments, administrative or process controls, direct or indirect measurements, sampling and analysis, and/or material accountability.

Waste analysis and characterization—Characterization of waste materials based on historical information or analytical testing.

Waste Acceptance Criteria (WAC)—Characterization requirements for each category of waste to be accepted and managed by Energy Systems Waste Management Organization (ESWMO). Generators must certify that wastes meet the appropriate WAC before the waste can be transferred to ESWMO.

Waste category—A specific category that identifies the waste type (i.e., sanitary, hazardous, mixed, LLW, TRU, or high-level radioactive).

Waste certification—The process of ensuring and attesting to the fact that a waste has been generated, containerized, and characterized in accordance with an approved Waste Certification Procedure. To complete the certification, the generator must document by signature that the waste complies with the WAC applicable to that waste category.

Waste certifier (WC)—The individual authorized to certify waste by signing the waste certification statement on the attachments to the UCN-2109 form.

Waste characterization—The process of identifying and quantifying the chemical, physical, biological, and other properties of waste to meet the WAC of the receiving organization. This includes the assignment of RCRA waste code(s), when applicable (40 *CFR* 261).

Waste consolidation area-An area located within the AOC used to compile waste soils that are potentially contaminated. Soils are placed on lined/diked areas and covered with high density polyethylene. The management of these waste spoils is to be consistent with the remedial action activity for closure of the site.

Waste Item Description (WID) form (UCN-2109)—Form lists the identity and the characteristics of a waste item, the smallest trackable unit of waste. It also lists the identity of the shipping/storage container into which the waste item was placed and any applicable handling information. All of the information on the form is required to register the waste item with the site Waste Management Organization; however, some of the information is only applicable to specific waste categories.

Waste Management Plan—An approved and agreed upon documented plan for characterizing, handling, disposing, transporting, staging, storing, and treating generated waste materials.

Waste Management and Remedial Actions Division—The operation division at ORNL that is responsible for daily waste management operations.

Waste packet—An individually wrapped and numbered bundle of waste.

Waste Pickup Request (WPR) form (TX-5753)—Form used to request the pickup of waste It lists the identities of self-contained waste items and/or standard waste shipping/storage containers to be picked up for TSD. The WPR is submitted to the site Waste Management Organization along with the corresponding set of waste item descriptions, waste item and container list, and container packing list forms. The WPR is uniquely identified by a request identification barcode placed on the form.

Waste stream—Source or process from which waste is generated (i.e., coring, drilling, decontamination operations).

Waste transporter—The individual or organization responsible for transportation of waste materials.

Waste type—A specific waste type: solid, liquid, sludge, or gas.

Well cuttings—Rock chips cut by a bit in the process of well drilling and removed from the hole in the drilling mud in rotary drilling or by the bailer in cable-tool drilling. Well cuttings collected at closely spaced intervals provide a record of the strata penetrated.

EXECUTIVE SUMMARY

This Waste Management/Waste Certification (WM/WC) Plan establishes the criteria, characterization and management methods, and operational techniques to be used for managing wastes that result from environmental restoration activities. The management techniques and operational elements of this plan allow the maximum possible volume of investigative derived waste (IDW) materials to remain within the area of contamination until final remedial action is completed. This plan also addresses hazardous and radioactive wastes that are not IDW. Management techniques for these materials conform to the technical and administrative requirements of the Resource Conservation and Recovery Act as reflected in project waste management procedures and applicable Martin Marietta Energy Systems, Inc., and Oak Ridge National Laboratory guidance and requirements.

The strategy set forth in this WM/WC Plan incorporates the appropriate combination of waste minimization strategies such as segregation and treatment, storage, and disposal practices that shall protect the environment and human health by keeping radiation and chemical exposure as low as reasonably achievable. The plan also includes the guidance provided by the Environmental Protection Agency in *Guide of Management of Investigative-Derived Wastes*, Office of Solid Waste and Emergency Response Directive No. 9345.3-03FS (EPA 1992).

A project waste management checklist, provided in Appendix C, is required for all ER Program remedial investigation, decontamination and decommission, and remedial action activities. The project WM checklist will be used in conjunction with the WM/WC Plan to describe the strategy for minimizing, handling, packaging, treating, transporting, characterizing, storing, or disposing of waste produced as part of the ER Program activities. The project WM checklist also contains guidance and recommendations for ensuring the protection of the worker, the environment, and the public. The project WM checklist will reference the ER Programmatic WM/WC Plan for more specific details.

The information provided in this programmatic WM/WC Plan incorporates the content requirements for waste certification procedures as required by EP-710 and ES/WM-10 Waste Acceptance Criteria for the Oak Ridge Reservation.

1. INTRODUCTION

This Waste Management/Waste Certification (WM/WC) Plan, written for the Environmental Restoration (ER) Program at Oak Ridge National Laboratory (ORNL), outlines the criteria and methodologies to be used in the management of waste generated during ORNL ER field activities. Other agreed upon methods may be used in the management of waste with consultation with ER and Waste Management Organization. The intent of this plan is to provide information for the minimization, handling, and disposal of waste generated by ER activities. This plan contains provisions for the safe and effective management of waste consistent with the U.S. Environmental Protection Agency's (EPA's) guidance. Components of this plan have been designed to protect the environment and the health and safety of workers and the public. It, therefore, stresses that investigation derived waste (IDW) and other waste be managed to ensure that

- all efforts be made to minimize the amount of waste generated;
- costs associated with sampling storage, analysis, transportation, and disposal are minimized;
- the potential for public and worker exposure is not increased; and
- additional contaminated areas are not created.

2. PURPOSE

The purposes of this WM/WC Plan are to detail the segregation, characterization, packaging, certification, and control of waste generated during preliminary assessments, site investigations and/or remedial investigation/feasibility studies, remedial actions, and decontamination and decommissioning (D&D) activities at ORNL ER sites from the point of generation to treatment, storage, and disposal (TSD) and to define waste minimization efforts for such wastes. This plan applies to the handling, staging, and characterization of IDW and other project related waste. Along with the project specific WM/WC checklist, this programmatic WM/WC Plan will establish and identify the processes that will be used for the certification of waste generated during ER field activities.

3. SCOPE

The ER Program was formed in September 1989. The ER Program's mission is to clean up past waste contamination while minimizing the threat to human health and the environment. The mission is concerned with all aspects of assessment and cleanup of facilities and sites contaminated with various quantities of hazardous, low-level radioactive, mixed, and transuranic (TRU) waste materials.

The major potential waste generating activities of ER are remedial investigations and feasibility studies, remedial actions, and D&D. The remedial investigation/feasibility studies/remedial action tasks focus on (1) site discovery, preliminary assessment, and site inspection; (2) site characterization, analysis of cleanup alternatives, and selection of remedies; (3) cleanup and site closure; and (4) site compliance monitoring. Activities may involve opportunities for minimization of releases to several environmental media, depending on the nature of the wastes inherent in each operable unit.

D&D is concerned with the surveillance and maintenance, decontamination and renovation for reuse, or demolition of surplus facilities. The D&D tasks focus on (1) surveillance and maintenance, (2) assessment and characterization, (3) environmental review, (4) engineering, (5) D&D operations, and (6) closeout. D&D activities are usually performed on reactors, hot cells, processing plants, storage tanks, and similar structures and operations.

This programmatic WM/WC Plan outlines the criteria and methodologies to be used as guidance in the management of waste generated during ER activities. The intent of this plan is to provide information for the minimization, handling, and disposal of waste by utilizing waste minimization, field screening, and sampling and analysis techniques, and for the transfer of waste to the Martin Marietta Energy Systems, Inc. (Energy Systems) Waste Operations Group.

4. ROLES AND RESPONSIBILITIES

This section defines the roles and responsibilities of those individuals involved in the management of waste generated from ORNL ER projects. The site roles and responsibilities listed are not be to be considered all inclusive.

4.1 PROJECT MANAGER

Responsibilities of the project manager include, but are not limited to the following:

1. review and approve the WM checklist;
2. complete the project WM checklist;
3. ensure that an approved and documented methodology for estimating waste volumes is used;
4. contact the ORNL Waste Management Operations Group (WMOG) to determine the best approach for the transfer and subsequent TSD options;
5. generate the waste minimization section as part of the project WM checklist;
6. contact the plant compliance office for guidance in managing all waste;
7. maintain documentation on all waste characterization and TSD for the life of the facility;
8. ensure that all support staff have taken the necessary training to enable them to generate, handle, package, and segregate waste and sign and complete waste management forms;
9. oversee technical, financial, and administrative performance of overall contract; and
10. distribute project documents for review, comment, and/or approval.

4.2 ORNL ER PROGRAM WASTE MANAGEMENT MANAGER

The ORNL ER Program WM manager or designee is responsible for the implementation of ER WM policies and procedures for ORNL ER Program projects. The ER Program WM manager will review, approve, and revise (as needed) ORNL ER Program documents at a minimum of once a year unless a change in waste streams dictates otherwise. The ER Program WM manager is also responsible for providing guidance in the preparation of project-specific WM checklist and review and approval all project-specific WM checklists.

The ER WM manager reports directly to the ER Program manager and is the primary contact between subcontractors, field operations, and various ORNL service and support organizations (e.g., Laboratory Protection, Energy Systems Waste Management Organization

(ESWMO), Plant and Equipment, Environmental Compliance and Health Protection, and Project and Construction Engineering]. The ER WM manager provides the necessary interface between subcontractors, field support, and ORNL Waste Operations. The ER WM manager will evaluate subcontractors' field operations for compliance with applicable waste management procedures, policies, permits, regulations, statutes, and laws. The ER WM manager has the right to stop work.

4.3 ORNL ER PROGRAM WASTE MANAGEMENT COORDINATOR

The ORNL ER Program WM coordinator:

1. documents and performs inspections of activities generating waste;

2. schedules meetings with ER WCs to discuss and disseminate information;

3. monitors WC activities to ensure that ER and Energy Systems waste management procedures and requirements are in compliance;

4. provides updated Waste Acceptance Criteria (WAC) information to generators and WCs as it becomes available;

5. ensures that the WCP has been implemented and that the waste conforms to the specific WAC before being transferred over to ESWMO;

6. makes revisions to WM plan and/or checklists as required if the WCP changes; and

   - resolves and reports all waste management issues to the ER WM manager,
   - prepares a monthly report consisting of waste management violations, volume of was generated per project, etc.,
   - provides specific ER waste management training for generators, and
   - ensures that all generators have had appropriate training.

7. provides guidance in the preparation of WM checklist; and

8. ensures that generators and WCs are adhering to the WM/WC plan and other applicable procedures.

4.4 ORNL ER TRAINING COORDINATOR

The ORNL ER Training Coordinator has the following responsibilities:

1. reviews the Training Management Information System (TMIS) data base to verify certifications for all individuals reported by project managers as being potential solid LLW (SLLW) and hazardous waste generators;

2. schedules and notifies potential hazardous and SLLW generators when and where to report for certification training; and

3. provides TMIS documentation on certified and hazardous waste SLLW generators to division waste certifiers (WCs) as requested.

4.5 ORNL WASTE CERTIFICATION GROUP (WCG)

The ORNL WCG has the responsibility of implementing and managing the ORNL WM Program. The ORNL WCG belongs to the Waste Management and Remedial Action Division. The responsibilities of ORNL WCG include the following:

1. reviewing and approving WM plans for technical content;
2. supporting the development of applications for off-site shipments;
3. acting as waste certification official for off-site shipments;
4. conducting inspections, audits, surveillance, and other assessments of field waste management activities;
5. issuing of nonconformance reports whenever programmatic deficiencies are identified;
6. verifying generator waste characterization data;
7. reviewing and approving Waste Certification Procedures (WCPs);
8. approving procedural variances; and
9. providing assistance to waste generators.

4.6 ORNL ER QUALITY ASSURANCE/QUALITY ASSESSMENTS

The ORNL ER Site Quality Assurance (QA) representative performs random surveillance on Energy Systems and ER activities. A specific checklist is developed from required documents (i.e., WM plans or checklists) and incorporated into the surveillance.

MK-Ferguson will have its own QA. All QA requirements should be explained and outlined within the project-specific QA Plan.

Quality improvement is covered in procedures ER/C-P1300, 1606, and 1608. Items covered in these documents are tracking of corrective actions and reporting of QA concerns.

4.7 ORNL ENERGY SYSTEMS WASTE MANAGEMENT ORGANIZATION (WMO)

ORNL WMO is responsible for providing review and approval of WM plans. The ORNL WMO is also responsible for picking up waste material from the waste storage area after it has been characterized and proper waste disposal forms have been completed by the generator and the waste certifier. The waste will be transported to an approved TSD facility in accordance with regulatory requirements and Energy Systems policies and procedures.

4.8 ORNL ENVIRONMENTAL COMPLIANCE ORGANIZATION

The ORNL Environmental Compliance Organization provides regulatory guidance for successful completion of the specific project and reviews and approves project WM plans. Responsibilities also include interfacing with the site ESWMOs on compliance-related issues. This organization is also responsible for reviewing *Waste Acceptance Criteria for the Oak Ridge Reservation* (ORNL 1994).

4.9 ER PROGRAM WASTE CERTIFIER

The WC is responsible for implementing this procedure and other Energy Systems procedures that is applicable to waste management. The WC reports to ORNL ER WM manager, facility line management and programmatically to the ORNL WCG. The WC is responsibilities are to

1. maintain certification to function as WC;

2. maintain contact between waste generators, ORNL ER WM manager, and the ORNL WCG;

3. distribute pertinent information to generators and ORNL ER Program Office as ORNL WCG provides it for program modification.

4. monitor compliance with this plan and applicable Energy Systems WM procedures;

5. prepare and implement WCPs to control waste certification activities;

6. certify, by signature on applicable forms, that the waste package meets the WAC and waste was generated and characterized in accordance with an approved WCP;

7. ensure that the waste is properly classified, characterized, and packaged in accordance with applicable WAC;

8. ensure that personnel performing activities that generate and package waste are properly trained;

9. perform self-assessments and internal surveillance of activities related to waste certification, generation, storage, labeling, and completion of WM forms;

10. perform weekly inspections and document waste generating activities that include tracking waste volumes on UCN 19611 " Environmental Restoration Waste Management Program Generated Waste";

11. coordinate with the Radioactive Solid Waste Operations (RSWO) group for the acceptance, pickup, and transfer of the waste package for TSD;

12. transfer project waste files to the project manager for filing for the life of the facility; these files must contain copies of all waste storage/disposal documents and laboratory data;

13. complete the ORNL ER Waste Generation Report (# 19611) weekly and forward a summary copy with the waste volumes and types for the month for each specific project to the ORNL ER WM manager and the Central ER WM Office each month;

14. maintain all laboratory analysis and waste certification data;

15. review and approve project specific WM checklists; and

16. complete and submit the waste certification variance request to ESWMO, as applicable.

4.10 ER CENTRAL WASTE MANAGEMENT ORGANIZATION

The ER Central WMO is responsible for providing overall guidance and policies for ER WM activities.

4.11 ENERGY SYSTEMS CENTRAL WASTE MANAGEMENT ORGANIZATION

Energy Systems Central WMO is responsible for providing overall guidance and policies for conducting WM activities at Oak Ridge Reservation (ORR) sites. Responsibilities include

1. ensuring consistent waste certification practices across ORR;

2. issuing and maintaining the *Waste Certification Program Plan for the Oak Ridge Reservation* (ORNL 1994c);

3. issuing and maintaining *Waste Acceptance Criteria for the Oak Ridge Reservation* (ORNL 1994b);

4. maintaining Energy Systems procedure *Oak Ridge Reservation Waste Certification Requirements* (ORNL 1994a);

5. approving variances to the WAC;

6. establishing waste certification training requirements;

7. ensuring that formal audits of the Energy Systems Waste Certification Program are conducted; and

8. supporting the development of applications for off-site waste shipments.

4.12 MANAGEMENT OF GENERATOR ORGANIZATIONS

Management appoints a WC for those operations in their organization that generate waste. Management is also charged with (1) maintaining active communication with the WC to ensure that resources necessary to perform waste certification functions are available and (2) providing a mechanism for discussing programmatic concerns with the ORNL WMO.

4.13 WASTE GENERATOR

A waste generator is defined as any individual, program, or organization whose activities result in the generation of waste. The waste generator can be an Energy Systems employee, a subcontractor, or the Department of Energy (DOE) prime contractor employee. Specifically, the individual generator is responsible for

1. minimizing waste production;

2. complying with applicable waste storage requirements;

3. attending and maintaining current appropriate ORNL waste generator training and facility-specific training, before generating waste;

4. packaging waste so that it is properly classified, identified, contained, and closed or sealed in accordance with the ORNL Energy Systems and/or ER requirements;

5. documenting, maintaining copies, and providing characterization data for the certification of generated waste;

6. certifying, by signature on applicable forms, that the waste packet meets the WAC; and

7. communicating with the WC to ensure that any issues in waste characterization or certification are promptly brought to the attention of the responsible individuals and that any new certification requirements or procedures are promptly instituted.

*Note: ER projects that use a contractor and generate waste will require dual signatures (a representative from ORNL ER will sign as generator and a representative from the contractor generating the waste will sign as the packager). The WC will sign as the generator and as the certifying officer.

4.14 PACKAGER

A waste packager or contractor is defined as any individual, program, or organization whose activities result in the packaging of waste materials. S(he) is responsible for

1. minimizing waste production;

2. attending and maintaining current appropriate ORNL waste generator training and facility-specific training, before generating waste;

3. securing an approved waste container from the WC;

4. packaging waste so that it is properly classified, identified, contained, and closed or sealed in accordance with ORNL Energy Systems and ER requirements;

5. documenting and providing characterization data for the certification of the generated waste to the ER waste generator;

6. certifying, by signature on applicable forms, that the waste is properly packaged and segregated and providing documentation of the waste contents;

7. communicating with the ER waste generator and ER WC to ensure that any issues in waste characterization or certification are promptly brought to the attention of the responsible individuals and that any new certification requirements or procedures are promptly instituted in routine operations;

8. completing entries on UCN-2109 for each packet of waste; and

9. maintaining copies of all characterization data generated by his or her organization for waste management purposes.

4.15 RADIOACTIVE SOLID WASTE OPERATIONS GROUP

The RSWO is responsible for the following

1. reviewing the generator's procedures for compliance with the ORNL on-site transportation manual;

2. inspecting the waste packages and reviewing the generators' documentation for compliance with the WAC;

3. approving special packaging, as necessary;

4. transporting the SLLW package to the solid waste storage area (SWSA); and

5. giving direction to the project manager as to the availability of storage, disposal or treatment options for waste that will be transferred over ESWMO.

4.16 RADIATION PROTECTION

The representative from the Radiation Protection Surveillance Section is responsible for the following:

1. monitors waste containers for contamination and radiation levels;

2. completes and attaches radiation hazard tags; and

3. completes applicable sections of waste disposal forms.

4.17 CHAIN OF COMMAND

The ORNL ER chain of command for addressing and reporting WM/WC issues is to follow the diagram as depicted in Fig. 1.

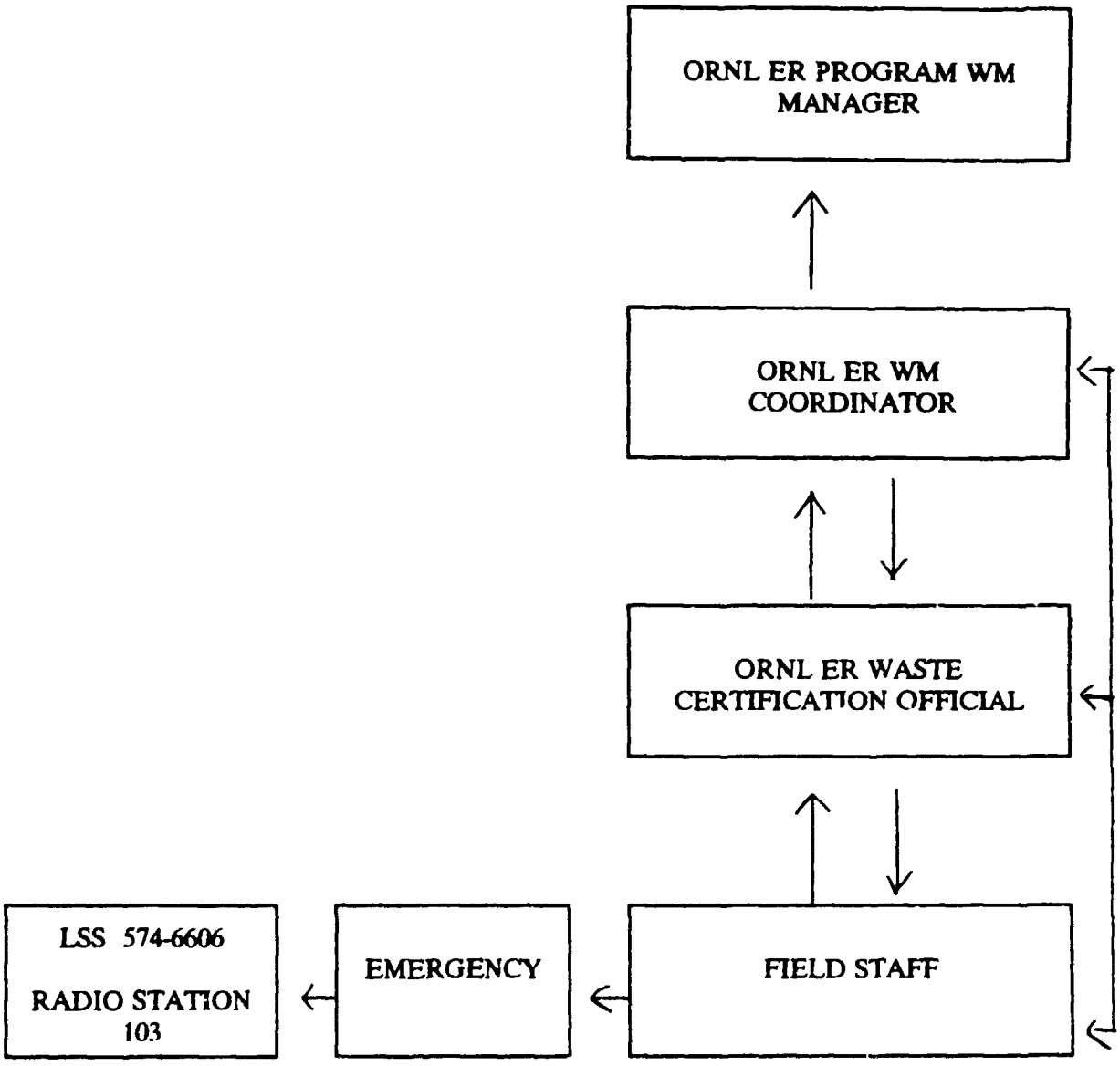

Fig. 1. Environmental Restoration Program Chain of Command. In case of an emergency, the field staff is to always contact the LSS with an immediate call to ER management staff (see following page).

Contact List for Generators

ORNL ER Program WM Manger 574-8268
ORNL ER WM Coordinator 241-4876
ORNL ER Waste Certification Officials • Kent Deroos: 241-2811 • Steve Childs: 241-2807
ORNL Radiation Protection 574-6701
ORNL Hazardous Waste Operations 574-1779
ORNL Solid Waste Operations 574-4126
ORNL Laboratory Shift Superintendent 574-6606 •Radio number—Station 103

5. WASTE AREA GROUPINGS AND AFFILIATED AREAS

A listing of all known active and inactive waste management areas, contaminated facilities, and potential sources of continuing releases to the environment is listed in the following sections. Because of the large number of sites on the list (approximately 250), ORNL combined the sites into 21 waste area groupings (WAGs), each of which contains sites within geographically contiguous and/or hydrologically defined units. Thus many of the original sites were called solid waste management units (SWMUs) and grouped together into WAGs.

The following sections present brief summaries of pertinent information concerning the location and site resources for each of the 21 WAGs. For a map of WAG locations and more detailed information regarding suspected contaminants on each WAG [see *Health and Safety Plan for Environmental Restoration Program at Oak Ridge National Laboratory* (Clark, et al. 1994)].

5.1 WAG 1

WAG 1 is situated in Bethel Valley, between Bethel Valley Road to the north, the White Oak Creek flood plain to the south, and First Creek to the west. The eastern side of the facility is bounded by Bldgs. 4501 and 4508 and a former waste burial area SWSA 2.

WAG 1 encompasses an area of approximately 150 acres and contains roughly 171 SWMUs. The WAG contains most of the original plant area of ORNL, a research and development facility that is owned by DOE and is currently managed by Energy Systems. The plant is one of three principal facilities located on the DOE's ORR, established in 1942 under the Manhattan Engineer District atomic weapons project. The area was primarily designated to collect and store liquid LLW (LLLW). Contained within WAG 1 are numerous types of storage facilities for holding LLLW. These facilities include ponds and impoundments; waste treatment facilities; shallow land burials, SWSAs, and miscellaneous chemical and sewage facilities. Various waste management and disposal methods have been used within WAG 1 in the past; some of these processes have resulted in releases to the environment.

5.2 WAG 2

WAG 2 of the ORNL is located in the White Oak Creek Watershed and is composed of White Oak Creek Embayment, White Oak Lake and its associated flood plain, and sections of White Oak Creek and Melton Branch downstream of the ORNL facilities. White Oak Creek and White Oak Lake provide the main surface water drainage system for ORNL. White Oak Creek is initiated from underground springs and surface water runoff located northeast of WAG 1, flows through the main plant area, and exits Bethel Valley through a gap in Haw Ridge, then empties into White Oak Lake. There are two SWMUs located within WAG 2; one encompasses the stream channels of White Oak Creek and Melton Branch, and the second includes White Oak Lake, White Oak Dam, and the surrounding embayment.

5.3 WAG 3

WAG 3 is located in Bethel Valley, approximately 0.6 of a mile southwest of the ORNL main plant. WAG 3 is composed of three SWMUs: the closed scrap metal area, the SWSA 3 site, and the Contractors' Landfill. Historical data indicate that the Closed Scrap Metal Area was activated in the early 1950s and was used through the mid-1960s as a contaminated scrap metal storage area. The SWSA 3 began operations in 1946 for the disposal of radioactively contaminated waste. The area was closed in 1951, but allowances have been made to store equipment and materials above ground until 1979. The Contractors' Landfill was opened in 1975 for the disposal of construction debris and fly ash from the ORNL steam plant. This facility is currently still in operation.

5.4 WAG 4

WAG 4 lies within Melton Valley just south of the ORNL and the main plant area. The area is accessible from Lagoon Road. Three SWMUs comprise WAG 4: SWSA 4 (SWMU 4.3), two experimental low-level seepage pits, and a LLW line located north of Lagoon Road (SWMU 4.1). The shallow land burial facility was previously used to manage radioactive and hazardous waste. The LLW pipeline system was previously used to transfer liquid radioactive wastes from the main plant area to waste trenches located at WAG 7. Out of the three SWMUs located within the facility, SWSA 4 represents the most significant potential for hazardous waste releases.

5.5 WAG 5

WAG 5 is located within Melton Valley and is situated approximately 1.2 miles south of the main plant area. The WAG contains 22 SWMUs. The SWMUs at WAG 5 are categorized as follows: LLW leak and spill sites, support facilities for ORNL's hydrofracture operations, a sludge basin, waste storage tanks, a hazardous waste land burial ground (shallow in nature), and a TRU waste storage area.

The largest land areas in WAG 5 are devoted to SWSA 5 and the TRU waste storage area. The remaining SWMUs at the facility are used in support of ORNL's hydrofracture operations, two LLW leak/spill sites, and a SWSA 5 impoundment utilized to extract water from sludge at the Process Waste Treatment Plant (Bldg. 3518).

Historically, SWSA 5 was used to dispose of SLLW generated at ORNL from 1959 to 1973. From 1959 to 1963, the SWSA 5 burial ground served as the Southeastern Regional Burial Ground for the Atomic Energy Commission. Approximately 10 acres of the site was set aside at its inception to allow for the retrievable storage of TRU wastes. SWSA 5 waste disposal records also fell victim to a fire, but some existing records provide some estimates of the type and amount of waste that is stored at the facility. The ORNL Waste Management and Remedial Actions Division estimates that 84,000 m^3 of waste containing 200,000 Ci of radioactivity is buried in SWSA 5.

The WAG 5 boundary also incorporates the surface facilities for both the old and new hydrofracture facilities. Since Melton Branch (WAG 2) flows between the old and new hydrofracture installations, it was necessary to demarcate a separate WAG boundary for the

New Hydrofracture Facility (NHF), even though the NHF is considered within WAG 5. The Old Hydrofracture Facility (OHF) and the NHF both consist of buildings containing control rooms, pumping equipment, mixing equipment, and solid storage equipment. The OHF pond and the contaminated oil storage tank at the NHF have been listed as separate SWMUs, but in fact are a part of the hydrofracture surface facilities.

Presently, LLW tanks W-24 through W-31 are being utilized to store evaporator concentrates pending a decision for long-term storage or disposal. These tanks are constructed of stainless steel, and their integrity is ensured by secondary containment. The OHF tanks have been removed from active use.

WAG 5 also includes two LLW leak sites; one is incorporated with the operations of the hydrofracture, and the second is a LLW transfer line that once serviced the OHF. These LLW transfer lines have since been removed from active status.

5.6 WAG 6

WAG 6 is located approximately 1.2 miles south of the main plant area, and is nestled within Melton Valley. Lagoon Road provides access to the facility from the main plant. SWSA 6 is designated as a shallow land burial site for non-Resource Conservation and Recovery Act (RCRA) low-level radioactive or nonradioactive wastes. The site began waste storage operations in 1969, and continued operations until May 1986, at which time DOE mandated a closure of the facility due to the discovery of RCRA regulated waste being deposited there. The site was reopened in July 1986, following numerous changes in operating procedures. WAG 6 is currently the only active disposal area for LLW at the ORNL plant. Due to the disposal of RCRA-regulated wastes at SWSA 6 before May 1986, the facility is currently undergoing closure operations under the auspices of Tennessee Department of Environment and Conservation Regulations 1200-1-11-.05(7) and (14) and EPA RCRA Regulations 40 *CFR*, Part 265, Subpart G.

Three SWMUs make up WAG 6. the largest SWMU is the 68-acre SWSA 6. The Emergency Waste Basin (EWB) constructed as an emergency holding basin for liquid waste from the ORNL main plant area and the Explosives Detonation Trench (EDT) for the disposal of explosives and shock-sensitive chemicals by detonation also are part of WAG 6. The EDT was located in the southeastern corner of SWSA 6 and is no longer in use. The area has since been back-filled, and its exact location is no longer known. The EWB has a surface area of 2 acres and a storage capacity of 15 M gal. The EWB has never been used for its intended purpose and now contains water from surface run-off and groundwater discharge from SWSA 6. Waste ranging from laboratory glassware to contaminated earth is currently being stored at the SWSA 6 and is packaged in various forms ranging from stainless steel drums to plastic bags.

5.7 WAG 7

WAG 7 is situated within Melton Valley and lies 1 mile to the south of the main plant area. Located within WAG 7 are 22 SWMUs. The various nature of these SWMUs are as follows: seven pits and trenches used for the disposal of LLW, seven fuel wells that contain acid solutions enriched primarily with uranium from the Homogenous Reactor Experiment,

experimental hydrofracture injection sites, leak sites, shielded transfer tanks, and a decontamination facility.

In terms of radioactivity, the seven pits and trenches are the major SWMUs in WAG 7. Over the course of their operation, an estimated 42 M gal of LLW containing approximately 1.2M Ci of (beta) radioactivity was transferred to these disposal units. With decay correction, it is estimated that approximately 200,000 Ci of Sr-90; 600,000 Ci of Cs-137; and considerably smaller amounts of U and TRU isotopes remain at the facility.

5.8 WAG 8

WAG 8 is located within Melton Valley and to the southeast of the main plant area. WAG 8 comprises most of the reactor facilities located outside the main plant. The area includes the Molten Salt Reactor Experiment and the High Flux Isotope Reactor. Waste products resulting from these experimental reactors were collected on-site in LLW tanks, and then transferred to WAG 1 (via a network of transfer lines) for treatment and storage. Presently, the Molten Salt Reactor Experiment is no longer in operation; however, the High Flux Isotope Reactor continues to operate on a routine basis. Twenty SWMUs are contained in WAG 8; these include holding ponds, the experimental hydrofracture site, hazardous waste storage facilities, and a waste transfer line with corresponding collection tanks.

5.9 WAG 9

WAG 9 lies within Melton Valley, and is situated approximately 0.6 miles southeast of the main plant. The area is situated just south of Bldg. 7500, above Melton Branch. The area is composed of six units: the Homogeneous Reactor Experiment (HRE) Pond, two inactive LLLW collection and storage tanks, a designated trash area, the Waste Evaporator, and the Waste Evaporator Loading Pit. The HRE surface impoundment is an unlined 315,000 gal earthen structure (pond) that was constructed in 1955. The impoundment was used from 1957 to 1961 as a waste storage impoundment for contaminated condensate from the HRE waste evaporator. Later, the pond was used to hold low-level shield water disposed of during cell maintenance. While in operation, chemical flocculation was used to promote waste settling in the pond. The impoundment was filled with soil and capped with asphalt in 1970.

The LLLW collection and storage tanks (7560 and 7562) are located south of the Waste Evaporator and north of the Waste Holding Pond, respectfully. The 7560 tank was designated to hold condensed clean vapor from the evaporator cell until the liquid could be sampled. The 7562 tank was designed to hold high-level radioactive wastes from 1957 to 1986. Also located in the area, is a 1400-gal septic tank (SWMU 9.3) installed to manage domestic sewage from the HRE facility. The tank supports lavatories located at the site and is not expected to contain any radioactive or hazardous wastes.

The designated trash area, located east of the HRE parking lot, lies north of Melton Valley Drive and directly across from Bldg. 7500. The unit once contained an old farm house that was utilized by HRE-1 and HRE-2 as a storage facility. All stored material (some contaminated with radioactivity) was removed from the premises in the mid-1960s. Some construction debris is still located at the site, and lies at the east end of the complex.

The waste evaporator facility is located at Bldg. 7502 on Melton Valley Road. Contained within the unit is the reactor (Bldg. 7500), the waste evaporator (Bldg. 7502), a hot storage area with decontamination pad, and an enclosed waste holding pond. The facility was proposed for three separate phases of experimentation during the 1950s, but due to corrosion problems encountered during the first experiment, no further efforts were conducted.

The Waste Evaporator Loading Pit is located immediately outside of Bldg. 7502. The pit was used to load carriers with LLLW from the Waste Evaporator Facility during the 1950s.

5.10 WAG 10

WAG 10 lies due south of the main plant area and is situated within Melton Valley. The area includes injection wells and grout sheets from four SWMUs, two of which were used in the development of the hydrofracture process at ORNL (SWMUs 10.1 and 10.2). The remaining two SWMUs are facilities (now inactive) that were utilized to dispose of LLW (SWMUs 10.3 and 10.4). The facilities themselves are associated with WAGs 5, 7, and 8. WAG 10 does not include the surface facilities used for the hydrofracture injections.

The hydrofracture process was an innovative waste disposal method that resulted in the elimination of over 12 million liters of LLW from 1959 to 1984. Waste materials processed by the hydrofracture method were injected with grout and additives under high pressure and were thereby forced into the shale formations at depths of 200 to 300 m. The injected slurry spreads throughout the fractures and bedding planes of the shale hundreds of meters from the injection site, thereby forming grout sheets. Hydrofracture injections were carried out at two experimental sites (HF1 and HF2), as well as at the OHF (HF3). A fourth site known as the NHF (HF4) conducted operational injections on a routine basis, and eventually replaced HF3. Operational injections were carried out at HF4 as recently as 1984. Hydrofracture injections were discontinued in 1986, upon the discovery of a contaminated well located in the vicinity of a grout sheet. Since this occurrence, the validity of the hydrofracture process has been criticized, and the closure of the facility has been mandated. The hydrofracture process area contains a total of 155 injection wells as of this writing.

5.11 WAG 11

WAG 11 consists of approximately 30 acres of land located 1 mile east of the intersection of Highways 95 and 58. The parcel lies within McNew Hollow and is located approximately 0.9 miles east of the junction of White Wing Road and the Oak Ridge Turnpike. There is only one SWMU in WAG 11.

WAG 11 was formerly known as the White Wing Scrap Yard, and during the 1950s and 1960s the sole purpose of the scrap yard was for the storage of chemical and nuclear wastes from various plant operations. The material consisted largely of contaminated steel tanks, trucks, earth-moving equipment, assorted large pieces of steel, stainless steel and aluminum, as well as reaction vessels used from Bldg. 3019 at ORNL. Previous investigative activities at the site have lead to the discovery of two solution cavities underlying the facility.

The area is currently overgrown with weeds, trees, and other types of vegetation. Scattered scrap metal and steel drums are visible as surface or subsurface debris, although as

of this writing; various clean up operations are underway at the site. It is estimated that the site has previously contained approximately 10,000 ft^3 of debris.

5.12 WAG 12

WAG 12 lies approximately 1.4 miles east-southeast of the main plant area. This parcel of land was designated as a landfill primarily for the disposal of the Plant's Contractors' demolition and construction debris. The area is no longer operational. The Contractors' Landfill is the only SWMU located in WAG 12 and is approximately 2.9 acres is size. The amount of material buried in WAG 12 is estimated to be between 30,000 to 50,000 m^3 when taking into consideration the amount of compaction (if any) and the depth of burial. The landfill was in operation from 1950 to 1975. The area was then graded level and grass was sewn. Waste specific records were not maintained on this SWMU, and, therefore, no administrative controls were implemented on the character of the waste being buried. As a result, small amounts of hazardous waste may exist at the site.

5.13 WAG 13

WAG 13 is composed of two environmental research areas and is a part of what is known as the 0800 Area. The tract was designated as a research testing site to measure the effects of nuclear fallout on the environment. The WAG includes two specific areas (SWMUs) where a number of simulated fallout experiments were carried out using the isotope Cs-137.

SWMU 13.1 contains approximately 5 acres of land and lies in a level floodplain along the Clinch River near Jones Island. The site included eight designated treatment plots that were used in simulated fallout experiments. Four of the plots were used as controls, and the remaining four were subjected to various amounts of Cs-137 exposure. During the experimentation period, soil and vegetation samples were collected and observations of the test area were recorded. Numerous experiments with short lived radioisotopes were also conducted in the vicinity of the cesium test plots; however, these isotopes are no longer detectable. The site is presently inactive.

SWMU 13.2 was set up to research the effects of Cs-137 runoff, erosion, and infiltration on silt loam soil. This research effort was related to ORNL's Civil Defense Program. In this experiment, the isotope was sprayed on soil plots containing various degrees of vegetation or ground cover. A total of 15 mCi of Cs-137 was used, and the total area tested was less than 215 ft^2. The study was conducted on October 20, 1964, and it is estimated that the amount of radioactivity remaining in the test area is approximately 8.0 mCi. The site is presently inactive.

5.14 WAG 14

WAG 14 is situated approximately 2.2 miles south of the main entrance of ORNL. The facility was constructed in 1954, to provide an economical means of obtaining shielding performance data that is free from ground scatter. This information was used in the development of portable reactor systems. The WAG contains two SWMUs and four large

towers (approximately 330 ft high) from which reactors and their associated measuring equipment were suspended. The towers were also used to check the durability of transportable shielding containers (casks) by drop testing.

The site also contains a scrap yard (Tower Shielding Facility Scrap Yard) designated as SWMU 14.1, which contains used steel drums and tanks. The scrap yard is the storage site of approximately three hundred 55-gal drums containing elemental sodium. The integrity of the drums has been checked, and almost all appear to be free from leakage. Sheets of depleted uranium are also stored in this area.

A septic tank and sewage treatment system comprise the second SWMU within WAG 14. This facility was used to provide sewage treatment services for operational personnel. The unit is designated as SWMU 14.2 and has no historical reports of leakage or discharge of hazardous materials. Sludge from the facility is pumped into a tanker truck, and is transported to the ORNL waste treatment plant for processing.

5.15 WAG 15

WAG 15 lies within Bear Creek Valley and is incorporated within the confines of the Y-12 Plant. A considerable number of ORNL divisions possess building space at the Y-12 Plant. The Y-12 Plant WM Division handles waste generated by the ORNL staff; although the two SWMUs located at the facility fall under the jurisdiction of the ORNL Remedial Action Program. SWMU 15.1 houses spent Z-oil from previous cyclotron operations (Bldg. 9201-2), and SWMU 15.2 provides a number of storage facilities for electrical transformers and capacitors.

The Z-oil was used as a coolant in the 86-in. cyclotron and was dedicated for the production of isotopes used in medical applications and industrial operations. The cyclotron was decommissioned in 1983. The Z-oil is reported to contain concentrations of polychlorinated biphenyls (PCBs) (< 50 ppm) and may be contaminated with radionuclides. The inventory of Z-oil stored at the facility is gradually being reduced as cyclotron decommissioning activities take place.

As of 1986, all of the electrical transformers and capacitors that were being stored in SWMU 15.2 were transferred to various subcontractors for disposal. Wastes generated from these clean up operations was disposed of at either the Y-12 Plant, or at facilities located at ORNL. This site is now inactive.

5.16 WAG 16

WAG 16, the Health Physics Research Reactor Area (also known as the Dosimetry Applications Research Facility) is located approximately 1.8 miles from the intersection of Bethel Valley Road and Melton Valley Access Road. The Health Physics Research Reactor consists of two buildings, one housing the unshielded reactor and the other acting as a combination laboratory/control building. The WAG consists of two SWMUs: the cesium forest and the Health Physics Research Reactor retention pond.

The cesium forest is a small ecosystem (66 x 82 ft) plot containing approximately 30 yellow-poplar trees that were intentionally contaminated with Cs-137 as part of a 1962 study. The study included inoculating the trees with Cs-137 to study the motility of the nuclide, and as an analog to the essential element potassium. A total of 467 mCi of Cs-137 was used in the study. The isotope was injected into the tree stems over a 4-d period (May 20–23, 1962). Various research activities are still conducted at this facility.

A retention pond, which comprises SWMU 16.2, was installed to collect groundwater that may have entered the concrete lined pits in the reactor building. This building houses the reactor core. According to the documentation available, the holding pond has never received any drainage from the storage pits or any other type of liquid that might have been added to the pond. It has been documented that the pond has received water through the testing of the fire sprinkler system. Contamination may exist in the pond due to precipitation.

5.17 WAG 17

WAG 17 is situated about 1 mile east of the main plant area. WAG 17 consists of the following designated areas: shipping and receiving, the machine workshop, the carpentry workshop, the paint shop, the welding shop, the lead burning facilities and operations area, the main garage, and the materials storage area required to support ORNL routine and experimental operations.

Eight SWMUs are included within the boundaries of WAG 17. These SWMUs range from a converted septic tank (now used as a sewage pumping station) to tanks used for oil waste storage and photographic chemical waste.

5.18 WAG 18

The Consolidated Fuel Reprocessing Area (WAG 18) is situated south of Bethel Valley Road and is located approximately 2.3 miles east of the main plant area. The site was initially designated as the location for the proposed Experimental Gas Cooled Reactor Project; however, the project was scrapped before the facilities could be completed. The existing facilities were later converted for use by ORNL's Consolidated Fuel Reprocessing Division.

A total of nine SWMUs are located within WAG 18. SWMUs 18.1a and 18.1b are retention basins used to accumulate storm water runoff. SWMU 18.2 is a holding tank used to store paint solvents. A septic tank system that is used to handle domestic waste at the facility is designated as SWMU 18.3. Four acidic waste storage tanks are designated as SWMUs 18.4a-d. SWMU 18.5 is an unused holding basin.

5.19 WAG 19

WAG 19 is located southeast of the main plant area. Six SWMUs that represent ORNL's hazardous waste treatment storage facilities are located within the WAG. Also included in the WAG is a new storage facility that has been permitted to store hazardous wastes (SWMU 19.1).

The six SWMUs located at the facility are grouped into two separate sections. The first section contains SWMUs 19.1 through 19.4, which are permitted to store hazardous and mixed waste. The second area includes two interim status SWMUs that are used to treat or dispose of gaseous or reactive hazardous wastes (SWMUS 19.5 and 19.6). All of the SWMUs located at WAG 19 are permitted by the Tennessee Department of Environment and Conservation, or are operated under a provisional status.

5.20 WAG 20

WAG 20 is located approximately 5 miles east of the ORNL main plant area and is situated on the southeast side of Chestnut Ridge and north of Bethel Valley Road. The site is bounded on the west side by Mt. Vernon Road.

Located within WAG 20 is the Municipal Sewage Sludge Application Site. The facility functions as a land disposal operation for digested sewage sludge from the city of Oak Ridge's sewage treatment plant. WAG 20 contains only one SWMU as of this writing.

5.21 WAG 21

WAG 21 addresses groundwater contamination across the ORNL site. The groundwater in WAG 21 consists of the aquifer systems for both Bethel Valley and Melton Valley. This WAG includes the fresh groundwater between the water table and the fresh water/saline water interface. It does not include storm flow, water in the unsaturated zone, or the deeper saline groundwater. To provide continuity between the groundwater and surface water interface, the WAG may include shallow features such as groundwater seeps.

5.22 ORNL ENVIRONMENTAL RESEARCH AREAS

In conjunction with the WAG facilities, there are approximately 68 environmental research areas located throughout the ORR. These areas are managed under the auspices of the ORNL ER Program, and activities conducted at these facilities must be approved by the appropriate personnel within the ER program, as well as with the Hazardous Waste Operations program coordinator.

Remedial investigations are not currently being conducted in these areas; however, it is anticipated that such activities may be warranted in the future. It is beyond the current scope of this document to address specific issues regarding future remedial actions that may be required at these locations. It is therefore recommended that this document serve only as a technical reference when considering proposed remedial investigations at these sites.

5.23 WASTE STREAM IDENTIFICATION

This section gives an overview of some of the waste stream generating activities that may be conducted on ORNL ER projects within the specific WAGs. The waste materials generated by the ER Program will be carefully controlled in accordance with federal, state, and local agency regulations, and Energy Systems procedures.

As part of its mission, the ER Program may generate wastes from a variety of activities, including

- site characterizations;
- site remediations;
- routine maintenance and surveillance of facilities;
- D&D of facilities and equipment;
- dismantling of facilities and removing equipment;
- treatment of contaminated soil, wastewater, and air streams;
- removal of contaminated materials for TSD;
- construction of containment systems in contaminated areas;
- demonstration of viable remediation and D&D technologies;
- decontamination operations (liquids and materials);
- drilling operation;
- deconning operations;
- autoclaving and packaging of noninfectious medical waste (dead animals);
- close support laboratory (CSL) waste; and
- environmental sampling (surface and groundwater, sediment, soils, vegetation, etc.).

6. ENVIRONMENTAL RESTORATION ACTIVITIES

6.1 SURFACE, GROUNDWATER, SOIL, AND VEGETATION SAMPLING

Waste generated during surface seep and groundwater sampling activities will include, but is not limited to, personal protective equipment (PPE), sanitary trash, and other sampling-related disposable equipment.

All surplus spoils (soils, sludge, etc.) and liquids that are generated at excavation or sampling locations can be left within the area of contamination (AOC). These wastes must be managed to protect human health and the environment without increasing the hazardous condition of the excavation or sampling location. As applicable, the ORNL/M-116 guidance document (ORNL 1993) may be used for the disposition of soils.

6.2 SAMPLING FROM WATERCRAFT

ER activities sometimes require the systematic sampling of lakes, ponds, and streams around the ORR. Activities conducted from watercraft may produce a wide variety of waste types including PPE, decontamination fluids, liquids, sanitary trash, and other related waste.

All surplus spoils (soils, sludge, etc.), and liquids that are generated at excavation or sampling locations can be left within the AOC. These wastes must be managed to protect human health and the environment without increasing the hazardous condition of the excavation or sampling location.

6.3 SPLIT SPOON SAMPLING WITH HOLLOW STEM AUGER FLIGHTS

The normal practice for obtaining subsurface soil samples involves driving a split-spoon sampler in front of an auger drill. The auger flights raise the soil cuttings to the surface as unwanted by-products of the sampling process. If the amount of soil in the split-spoon is more than the sample volume, the remnants are considered to be surplus spoils. Waste associated with this type of sampling includes PPE, decontamination fluids, sanitary trash, soil cuttings, and other related waste material. To minimize the amount of waste generated, the diameter of auger flights and split spoons should be considered.

All surplus spoils (soils, sludge, etc.) and liquids that are generated at excavation or sampling locations can be left within the AOC. These wastes must be managed to protect human health and the environment without increasing the hazardous condition of the excavation or sampling location.

6.4 CORE DRILLING

Core-barrel drilling is commonly used to take core samples for geological and contaminant transport data. The process involves the use of drilling fluids (usually water) to lubricate and cool the drill bit and to remove drill cuttings from the bore hole. Wet core

drilling methods produce large quantities of rock flour that could contain as much as 95% water. The residual drilling fluids may be used in a recirculating manner to assist in waste minimization.

All surplus spoils (soils, sludge, etc.) and liquids that are generated at excavation or sampling locations can be left within the AOC. These wastes must be managed to protect human health and the environment without increasing the hazardous condition of the excavation or sampling location.

6.5 AIR-ROTARY DRILLING

This method of drilling is used in the process of monitoring well installation. This process involves the use of drilling fluids (water) to lubricate and cool the drill bit and to remove drill cuttings from the bore. Residual drilling fluids, rock flour, drill cuttings, PPE, decontamination fluids, and sanitary trash are generated as part of this activity.

All surplus spoils (soils, sludge, etc.) and liquids that are generated at excavation or sampling locations can be left within the AOC. These wastes must be managed to protect human health and the environment without increasing the hazardous condition of the excavation or sampling location.

6.6 SURFACE SOIL SAMPLING USING A BARREL AUGER

This method of collecting soil samples is best employed in soils with little or no gravel. A manually operated barrel auger is used to penetrate soil to a desired depth and obtain a soil sample. The auger consists of a barrel attached to an orchard bit. The bit cuts the soil, and the cuttings are forced into the barrel. Waste associated with this type of sampling includes PPE, decontamination fluids, sanitary trash, and soil cuttings. The diameter of the barrel auger is to be taken into consideration for potential waste minimization opportunities.

All surplus spoils (soils, sludge, etc.) and liquids that are generated at excavation or sampling locations can be left within the AOC. These wastes must be managed to protect human health and the environment without increasing the hazardous condition of the excavation or sampling location.

6.7 GEOPHYSICAL SURVEYS AND MAPPING

Geophysical surveys are used to detect underground metal debris such as drums or discarded metal parts. The materials necessary to complete the survey are minimal, including a noncontacting conductivity meter, a magnetometer, data logbook, and stakes or flags used for grid identification. Waste associated with this type of field activity includes PPE, decontamination fluids (if necessary to decontaminate equipment), and sanitary trash.

All surplus spoils (soils, sludge, etc.) and liquids (if applicable) that are generated at excavation or sampling locations can be left within the AOC. These wastes must be managed to protect human health and the environment without increasing the hazardous condition of the excavation or sampling location.

6.8 WELL INSTALLATION

After the bore hole is drilled, the well casing is then inserted into the borehole, packed, and sealed. The construction of the protective casing and the guard post are the last steps in the installation process. A wide variety of waste may potentially be generated with these activities. The waste includes PPE, soil cuttings, sanitary trash, excessive materials, and decontamination fluids.

All surplus spoils (soils, sludge, etc.) and liquids that are generated at excavation or sampling locations can be left within the AOC. These wastes must be managed to protect human health and the environment without increasing the hazardous condition of the excavation or sampling location.

6.9 WELL MAINTENANCE

Monitoring wells and piezometers that are in operation are periodically evaluated for superficial problems and for needed repairs or upgrades. Maintenance activities for monitoring wells and piezometers may include, but are not limited to, tasks such as installing protective casings, guard posts, and locks; grout seal repair; repairing protective casings; installing riser caps; repairing or replacing broken hoses; extending casings; and installing pumps and redeveloping wells. As with the installation of monitoring wells, maintenance activities potentially may generate a wide variety of waste. The waste may include PPE, soil cuttings, sanitary trash, and decontamination fluids.

All surplus spoils (soils, sludge, etc.) and liquids that are generated at excavation or sampling locations can be left within the AOC. These wastes must be managed to protect human health and the environment without increasing the hazardous condition of the excavation or sampling location.

6.10 WELL PLUGGING AND ABANDONMENT

Work activities for well plugging and abandoned projects will be directed by the engineering methods and procedures specified and described in the Programmatic Health and Safety Plan. These activities may include well splitting, grouting, and chipping. Activities are directed by established procedures written to address factors such as geological location, depth, casing type, and design of the well. Well plugging consists of mixing coarse granular bentonite chips (e.g., Holeplug™) or bentonite pellets and water within a well, then manually tamping the mixture with a rod until the well is elevated to a specified depth. The tamping is performed continuously as the chips and water are introduced into the well in specified increments. When the well depth is raised to the specified depth, the well is ready for grouting. Waste that potentially may be generated during this activity includes PPE, sanitary trash, and decontamination fluids.

All surplus spoils (soils, sludge, etc.) and liquids that are generated at excavation or sampling locations can be left within the AOC. These wastes must be managed to protect of human health and the environment without increasing the hazardous condition of the excavation or sampling location.

6.11 WELL SPLITTING

Well splitting involves the use of heavy equipment such as a drill rig or a track drill to perforate the casing of a well before decommissioning the well. Waste that may be associated with splitting includes metal casing, polyvinylchloride pipe, and PPE.

All surplus spoils (soils, sludge, etc.) and liquids that are generated at excavation or sampling locations can be left within the AOC. These wastes must be managed to protect human health and the environment without increasing the hazardous condition of the excavation or sampling location.

6.12 RADIOLOGICAL SCOPING SURVEYS

Radiological scoping surveys involve measurement of surface radiation levels and may also include surface sampling of soil (depth 0 to 6 in.), water, and/or vegetation usually at places where the walkover survey has indicated radiation levels higher than background. Walkover surveys involve radiological measurements made at the ground surface using alpha, gamma, and beta-gamma radiation detectors. Waste that may be generated during these scoping surveys include PPE, sanitary trash, and decontamination fluids.

All surplus spoils (soils, sludge, etc.) and liquids that are generated at excavation or sampling locations can be left within the AOC. These wastes must be managed to protect human health and the environment without increasing the hazardous condition of the excavation or sampling location.

6.13 SAMPLING CONTAINERS, DRUMS AND B-25 BOXES

In some instances, containers, drums or B-25 boxes of wastes may need to be sampled to determine the radiological or chemical contents of the container. This sampling could be a normal routine operation or an emergency response activity. In either case consideration should be taken to obtain only the volume required for the analysis.

All surplus spoils (soils, sludge, etc.) and liquids that are generated at excavation or sampling locations can be left within the AOC. These wastes must be managed to protect human health and the environment without increasing the hazardous condition of the excavation or sampling location.

6.14 UNDERGROUND STORAGE TANK SAMPLING AND REMOVAL

Underground storage tank activities involve the removal or sampling of tanks. The underground storage tanks usually are excavated and removed from the ground and sampling efforts employed to determine if any contamination is present. A variety of waste types and volumes may be generated due to these types of activities. Waste that may potentially be generated during underground storage tank removals includes PPE, sanitary trash, and decontamination fluids.

All surplus spoils (soils, sludge, etc.) and liquids that are generated at excavation or sampling locations can be left within the AOC. These wastes must be managed to protect human health and the environment without increasing the hazardous condition of the excavation or sampling location.

6.15 REMEDIAL ACTION

Remedial actions involve efforts to stabilize or remove contaminants that have been identified during a site remedial investigation. Once the contaminant have been identified and the extent of contamination is known, clean-up efforts can be directed to address the problems.

6.16 DECONTAMINATION AND DECOMMISSIONING

The ORNL D&D Program is a branch of the DOE ER D&D Program and functions to provide collective management of all surplus sites under ORNL control on the ORR.

Activities covered under the D&D Program consist of ensuring adequate containment of residual radioactive materials remaining at the facility, providing safety and security controls to minimize the potential hazards to site personnel and the general public, and managing the facilities in the most cost-effective manner while awaiting decommissioning.

7. TYPES OF WASTE

Due to the nature of ER Program activities and its involvement in site investigation, remediation and D&D activities, various types of waste and waste forms will be generated. The waste that is generated will be managed, depending on the activities involved in the wastes generation process, by the applicable Energy Systems procedures and regulatory drivers. The various regulatory drivers and applicable Energy Systems procedures that the waste may be managed under include the following:

1. *Guide to Management of Investigative-Derived Wastes* (EPA 1992);

2. *Health, Safety, and Environmental Protection Procedure for Excavation Operations* (ORNL 1993);

3. 40 *CFR*;

4. DOE Order 5820.2A, "Radioactive Waste Management";

5. *Waste Acceptance Criteria for the Oak Ridge Reservation* (ORNL 1994b);

6. *Waste Certification Program Plan for the Oak Ridge Reservation* (ORNL 1994c); and

7. Oak Ridge Reservation Waste Certification Requirements (ORNL 1994a).

The aforementioned documents are not to be considered as all inclusive of the requirements for managing waste at ORNL.

The following subsections identify various waste types generated by ER activities.

7.1 WASTE TYPES

Energy Systems ER Program tracks waste according to the type of waste. Potential waste types generated from ER activities may include decontamination fluids; well development and purge water; debris; sludge; soil; solvents and oil; PPE and trash; asbestos; PCB equipment; equipment, metal, and miscellaneous solid waste. A description of each of these wastes is provided in the following sections.

7.1.1 Decontamination Fluids

Designated sampling equipment and excavation equipment, such as hollow-stem auger flights, split-barrel samplers, sample trays, trowels, backhoes, and bulldozers will be

decontaminated after use according to project or Energy Systems procedures. Some decontamination methods employ the use of a decontamination unit that recirculates the decontamination fluids to minimize the amount of waste generated.

7.1.2 Well Development/Purge Water

Well development water is generated during the installation of wells or sampling activities. Depending on the concentration of contaminates and the area, well development water may be purged onto the ground.

7.1.3 Debris

Debris includes such material as wood, roofing materials, construction soil, metal and plastic well casings and concrete. These materials are usually limited to remedial action or D&D projects. This type of waste is normally transferred over to ESWMO for disposition.

7.1.4 Sludge

Sludge is generated primarily from remedial investigation activities and may originate from the residual waste materials of settling basins, tanks, pipelines, or equipment. This waste must be diverted and combined with an absorbent material before transferred over to ESWMO. This type of waste may also be managed in the AOC.

7.1.5 Soil

Soil boring and surface soil samples collected during ER activities are the primary contributors to this type of waste. These types of soils are normally replaced within the area from which it derived or used as backfill in accordance with *ORNL Health, Safety, and Environmental Protection Procedure for Excavation Operations* (ORNL 1993).

7.1.6 Solvents/Oils

Waste solvents or oils are generated as a result of sampling oils or dielectric fluids, spills and various types of equipment that may contain specific solvents or oils. These forms of waste are normally transferred to ESWMO after characterization.

7.1.7 PPE

Waste generated on sites by the use of PPE include paper, shoe scuffs, Tyvek suits, respirators, wipes, etc. PPE is normally transferred to ESWMO for disposition.

7.1.8 Asbestos

During site activities, asbestos containing materials may be present and require removal. These materials may include thermal insulation, surfacing materials, or a variety of other materials. Asbestos waste is handled as TSCA waste. Asbestos material is more likely to be encountered in D&D activities. This type of waste is transferred over to ESWMO after characterization has been performed and the appropriate paper work is completed.

7.1.9 PCB

Typically, waste in this form is not generated during remedial investigation activities, only during D&D activities. Equipment such as transformers, capacitors, and pumps may contain PCBs. This waste is transferred over to ESWMO after characterization.

7.1.10 Metals

This type of material is usually generated during D&D type activities, but may at times be generated during other types of activities. Metal materials, such as shielding (lead) and drums, are also encountered.

7.1.11 Laboratory Solid and Liquid Waste

This category includes samples that are returned from the laboratory as waste. This waste may be returned to the AOC as long as such actions do not increase the hazardous condition of the site or harm human health. Samples that have been designated as archive samples may also be returned to the AOC without increasing the hazardous condition of the site or harming human health. As applicable, the ORNL/M-116 guidance document may be used for the disposition of soils (ORNL 1993).

7.2 WASTE CATEGORIES

Waste generated as part of ORNL ER activities that will be transferred to ESWMO for disposition shall be characterized as to its proper waste category. Below is a listing of waste categories that may apply to ER waste.

7.2.1 RCRA Waste

Generated waste is classified as RCRA waste if it meets one of two criteria: (1) it is an EPA-listed waste identified in 40 *CFR* 261 or (2) it exhibits one of the four hazardous waste characteristics (i.e., ignitability, corrosivity, reactivity, or toxicity) described in 40 *CFR* 261.21 through 261.24.

The generator is required to make an accurate waste determination. Site information, such as storage and disposal records, manifests, and spill reports may be used to determine if the potential for a RCRA hazardous waste exists. Testing results or documented process knowledge of a material's properties will be the information relied upon for characteristics of the waste.

If there is no positive evidence (i.e., records, test results, other knowledge) that waste is not RCRA waste, management of the waste in accordance with RCRA Subtitle C is not required by EPA. However, the waste shall be handled in a suitable manner to ensure that the health and welfare of the worker, public, and environment is protected.

If the RCRA waste was generated as part of the IDW process, it must be managed according to 40 *CFR*, with the exception of the 90-d limit when stored in the AOC (see Energy Systems Procedure, ERWM/ER-P2103, Rev. 0).

7.2.2 TSCA Wastes

Energy Systems regulates the handling of waste with PCB concentrations of equal to or greater than 2 ppm to ensure responsible handling of the material. Waste with a concentration of PCBs greater than 50 ppm is federally regulated under TSCA and should be disposed of within 1 year of generation. TSCA also regulates the use of asbestos and governs its removal.

7.2.3 Low-Level Liquid Waste

LLLW consists of liquid materials that contain radionuclides regulated under the Atomic Energy Act of 1954, as amended, that cannot be classified as high-level waste, TRU waste, spent nuclear fuel, or by-product material as defined by DOE Order 5820.2A.

7.2.4 Solid Low-Level Waste

SLLW consists of solid materials that contain radionuclides regulated under the Atomic Energy Act of 1954, as amended, that cannot be classified as high-level waste, TRU waste, or spent nuclear fuel or by-product material as defined by DOE Order 5820.2A.

7.2.5 TRU Waste

This category includes radioactive waste contaminated with alpha-emitting TRU radionuclides (atomic number >92) with half-lives greater than 20 years and concentrations >100 nCi/g at the time of assay. Additional radioisotopes that are managed as TRU waste at ORNL include ^{252}Cf, ^{244}Cm, and ^{233}U. TRU waste shall be segregated from SLLW, and before any TRU waste is generated, approval must be given by the WCG.

7.2.6 Mixed Waste: LLW/RCRA, LLW/ TSCA, TRU/RCRA and LLW/RCRA/TSCA

Mixed waste may be generated during any type of ER field activity and shall be classified as LLW/RCRA, LLW/TSCA, TRU/RCRA, TRU/TSCA, TRU/RCRA/TSCA, or LLW/RCRA/TSCA if the waste meets each individual waste classification within the mixture.

7.2.7 RCRA/PCB Waste

Waste shall be classified as RCRA/TSCA if the waste is characterized as RCRA waste and contains PCBs at a concentration of 2 ppm or greater.

7.2.8 Sanitary Waste/ Industrial Waste

All waste that is not classified according to the categories previously discussed shall be considered as sanitary waste/industrial waste. That is, all waste that is not hazardous, radioactive, mixed, classified, or TSCA waste and is acceptable for disposal at a Tennessee Department of Environment and Conservation permitted sanitary/industrial landfill will be handled as sanitary waste, including such materials as garbage, refuse, rubbish, paper, wood, plastics, nominal amounts of metal, construction materials, and demolition materials.

7.2.9 Liquid Wastes to be Treated at the K-25 Site

This category includes liquid wastes, both hazardous and nonhazardous, that are treated at the Central Neutralization Facility. These wastes are composed of the scrubber blowdown from the TSCA Incinerator, steam plant effluents, and various small quantity or infrequent streams dispositioned using the routine waste management process. This category also includes liquid wastes, both hazardous and nonhazardous, that are bulked in tanks K-1202 and K-1420-A before treatment.

7.2.10 Liquid Wastes to be Treated at ORNL

This category includes liquid wastes to be treated by the ESWMO liquid waste treatment systems at ORNL. These systems are the LLLW system, the Process Waste Treatment Plant, and the Nonradiological Wastewater Treatment Plant. RCRA and TSCA wastes are excluded from these facilities.

7.2.11 Liquid Wastes to be Treated at the Y-12 Plant

This category includes liquid wastes, both hazardous and nonhazardous, to be treated by ESWMO liquid waste treatment systems at the Y-12 Plant. These systems are the Groundwater Treatment Facility, the Waste Coolant Processing Facility, the West Tank Farm, the West End Treatment Facility, the Central Pollution Control Facility, and the Plating Rinsewater Treatment Facility.

8. WASTE CHARACTERIZATION/CERTIFICATION

Generators and packagers of ER waste are required to certify that waste generated as part of ER activities conform to applicable WACs and WCPs before the waste is received and managed by ESWMO. All generated waste, before transfer to ESWMO, must have characterization data on the specific waste stream available. Characterization data may be gathered through process knowledge, documentation from previous studies, nondestructive testing, and/or sampling and analysis.

Waste stream(s) and descriptions of areas from which waste may be generated is covered in Sects. 6 and 7, respectively. The following information must be supplied and certified by the generator as a condition of waste acceptance by ESWMO:

1. description of the waste, the matrix and its major contaminants must be reported;
2. radioisotopes present in the waste (the concentration of all radioisotopes that comprise greater than or equal to 1% of the activity in the waste package must be reported);
3. total alpha activity (in Curies);
4. total beta/gamma activity (in Curies);
5. pH of the waste, if applicable;
6. packaging and labeling (must meet regulatory and/or Energy Systems requirements); and
7. required documentation consisting of completed forms UCN-21009, "Waste Item Description"; UCN-20117, "Waste Certification Statement"; and documentation supporting waste characterization (UCN-20116, "Process Knowledge Documentation" or analytical data) (see Appendix A for other applicable WM forms).

8.1 RADIOACTIVE WASTE CHARACTERIZATION/CERTIFICATION

The concentration of radionuclides in each waste packet may be determined by direct measurement or by indirect methods, such as the use of scaling factors, material accountability, or properly documented process knowledge. SLLW must be segregated and packaged into appropriate categories as defined in the following paragraphs.

Contact handled SLLW—Packaged waste with an unshielded container surface radiation exposure equivalent rate of $\leq$200 mrem/h. Contact handled waste is divided into two categories: compactible and noncompactible.

Remote handled SLLW—Packaged waste with an unshielded container surface radiation exposure equivalent rate of >200 mrem/h. Remote handled waste is divided into two categories: (1) >200 mrem/h to 1 rem/h and (2) greater than 1 rem/h.

Fissile waste material—Solid waste that contains the isotopes ^{233}U, ^{235}U, ^{238}Pu, ^{239}Pu, ^{241}Pu, and/or the elements neptunium, americium, curium, berkelium, and californium. If the amount of fissile isotopes placed in a package exceeds 1 g of ^{235}U equivalent, or the concentration of fissile isotopes are greater than 1 g/ft^3 ^{235}U equivalent, then it will be handled as fissile waste and will be stored retrievably.

Contaminated asbestos waste—Any waste that contains commercial asbestos or asbestos material that is radioactively contaminated.

8.1.1 Curie Content Determination and Conversions

Radionuclide identity will be determined by Health Physics surveys, gamma scan, gross alpha, gross beta or isotopic analysis. Alpha results indicating 1% or more of total energy derived from alpha radiation for bulk sample material will require a pulse height analysis or other isotopic analysis to determine isotope identity. All other homogeneous waste material derived from this activities, that is, tools, PPE, etc., will be treated as unsampled waste and will be surveyed by Health Physics to determine activity level. Activity determined by Health Physics analysis will be converted from dose rate or disintegration per minute to curie content.

Conversions from dose rate to curies will be formulated on an individual isotope basis. Once the isotope is identified, an average range of energy for a given isotope will be utilized to generate a conversion equation. This equation will be derived from analytical data or process knowledge.

An example for activity conversion will be made using a formula or other approved method.

Example

*Measure counts per minute (gamma) from bag/receptacle of dry active waste. Estimate total (gamma) curie (Ci) from the following formula:

$$\text{Total (gamma) } \mu\text{Ci} = \frac{\text{cpm measured/instrument efficiency (cpm/dpm)}}{2.2 \times 10^6 (\text{dpm}/\mu\text{Ci})}$$

From laboratory analysis, isotopic breakdown of the original sample could be as follows:

Isotope	Percent of total activity
^{137} Cs	25
^{90} Sr	25
^{240} Pu	50

If a calibrated field instrument having an efficiency specific to an identified isotope (^{137} Cs) of 0.2 cpm/dpm yields a reading of 1000 cpm gamma when scanning a piece of handling equipment, the contribution of the gamma decay of that isotope may be calculated as follows.

$$\frac{1000 \text{ cpm}}{0.02 \text{ cpm/dpm}} = 2.27 \times 10^{-3} \text{ } u\text{Ci gamma (Cs-137 in this example)}$$

$$\frac{}{2.2 \times 10^{6} \text{ dpm/}u\text{Ci}}$$

Assuming that the isotopic breakdown in this waste is similar to the original laboratory analysis, the respective activity of ^{90}Sr and ^{240}Pu can be calculated by comparing their relative concentrations to that for ^{137}Cs as follows:

2.27×10^{-3} uCi $\times$ 25/25 = 2.27×10^{-3} uCi ^{90}Sr
2.27×10^{-3} uCi $\times$ 50/25 = 4.54×10^{-3} uCi ^{240}Pu

8.1.2 Direct Measurements

Measurement of total gamma emissions from a containerized package may be used to determine radionuclide inventory concentrations, provided that adequate information is known about the radionuclide inventory and isotopic ratio to make reliable assumptions as to the source of activity. Instruments used to activity rate for waste packages include the Geiger Mueller survey and the scintillation probe.

Curie content must be determined and documented for each waste package. Sample calculations must be submitted with the 2109 Formset.

*Note: The type of instrument used to obtain exposure rates, dpm, and any calculations performed for determining curie content must be documented and retained with the generators' waste disposal records.

8.1.3 Sampling and Analysis

Analysis will be performed in accordance with applicable procedures for the facility in which the analysis is being performed. Analysis of radioactive samples will be performed by Analytical Chemistry Division representatives or an approved on- or off-site laboratory.

ORNL ER Program CSL is used to analyze and screen samples for both radiological (gross alpha, gross beta, tritium, carbon-14, gamma spectroscopy, etc.) and chemicals. Samples are analyzed or screened for the purpose of assuring that samples and waste meet DOT and WAC.

Analytical data will be made available to project team personnel, as well as incorporated into and attached to the Request for Disposal (RFD) forms. The analytical and isotopic analysis data will also be used to formulate a conversion table for each waste stream associated with the project if applicable. Smear samples from unsamplable material derived from a project will be analyzed by utilizing counter test alpha and counter test beta technology.

8.1.4 Process Knowledge

Process knowledge as it applies to waste certification, documented knowledge of the source, constituents, and processes associated with a waste that allows a reliable estimation of the components and component quantities in waste from a specific waste stream. The applicability of process knowledge must be validated on a periodic basis.

8.1.5 Waste Acceptance Characteristics Approved by ESWMO

1. SLLW must be characterized by the waste generator to identify actual physical and chemical characteristics, weight, volume, and major radionuclide content and concentrations.

2. Generally, the quantity of radioactive material in each container is limited by the measured unshielded surface exposure equivalent rate of the packaged waste and radiation protection as low as reasonable achievable procedures and practices.

3. Concentrations of radionuclides contained in the waste shall not exceed the Class C limits as established in 10 *CFR* 61.55, subsection (a)(2), Tables 1 and 2. The maximum amount of fissile isotopes to be placed in a standard SLLW package shall not exceed 1 g of ^{235}U or equivalent or the concentration of fissile isotopes shall be <1 g/ft^3 ^{235}U equivalent.

4. Radioactive, nonradioactive, hazardous, and mixed waste shall be segregated as they are generated in accordance to the TSD facility WAC.

5. Free liquids shall not be disposed of in the SWSA facilities. All liquids shall be solidified, permanently absorbed, or otherwise bound in the waste matrix by inert materials, if the waste is to be managed within an ESWMO SLLW area.

6. Bottles that contained liquids shall be well drained and waste containing absorbed moisture shall be squeezed out or, if practical, evaporated from the waste materials. Bottle lids must be removed from bottles before disposal.

7. SLLW shall not be capable of detonation, explosive decomposition, reacting at normal temperatures and pressures, or explosively reacting with water, thus, affecting the integrity of the container.

8. SLLW shall not contain or be capable of generating quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste.

9. SLLW shall not be pyrophoric. Pyrophoric materials contained in waste shall be treated, prepared, and packaged to be nonflammable.

10. The SLLW form shall be stable under the presence of moisture, microbial activity, and internal factors such as radiation effects and chemical changes.

11. The exterior of all waste packages shall be free of transferable contamination. This is defined as:

<20 dpm/100 cm^2 of alpha and
<200 dpm/100 cm^2 of beta-gamma.

*Note: Except ^{125}I, ^{129}I, and ^{227}Ac that have a limit of 20 dpm/100 cm^2, and ^{3}H and ^{14}C that have a limit of 1000 dpm/100 cm^2.

12. For sludge to be accepted as SLLW, it must not contain free liquids.

13. In the event that a generator's waste will not fill a 4 ft × 4 ft × 6 ft metal box, the waste may be staged at the SWSA for packaging by SWSA personnel, provided that the waste is acceptable for transfer.

14. The WC will document each SLLW packet on the TX-5749 Container Packing List form.

15. The generator will document each SLLW container on the TX-5753 Waste Pickup Request.

8.1.5.1 Excluded waste material

The following materials shall be excluded from radioactive SLLW:

1. free liquid (including solvents and oils);

2. compressed gases (aerosol cans must be punctured); and

3. hazardous waste.

For additional information on other groups of waste streams that are regulated and/or will be treated on an ORR site (seven categories of waste are required to be certified on the ORR). See *Waste Acceptance Criteria for the Oak Ridge Reservation* (ORNL 1994b).

8.1.5.2 Free liquids

The absence of free liquids must be certified for wastes that are in solid form. A free liquid is defined as any liquid that will readily separate from the solid portion of the waste under normal temperature and pressure.

For SLLW subcategories as defined in ES/WM-10 (ORNL 1994b), the waste matrix must pass the paint filter test as described in "Paint Filter Liquids Test," Method 9095, *Test Methods for Evaluating Solid Waste*, 40 CFR 264.190(a).

8.1.5.3 Compressed gases

Unpunctured aerosol cans or gas cylinders present a significant hazard that must be properly managed and are prohibited in SLLW.

8.1.5.4 Hazardous wastes

This category includes wastes that are re regulated by the EPA under RCRA. RCRA waste contains no radioactive constituents.

8.1.5.5 TSCA waste

TSCA waste is defined in 40 *CFR* 761; it includes, but is not limited to, PCB waste and PCB-detectable waste as defined in Energy Systems Standard ESS-EP-125, Management of PCBs and asbestos.

8.1.5.6 RCRA mixed and/or TSCA radioactive waste

This category includes RCRA and/or TSCA waste that is also contaminated with radioactive constituents as defined by the Atomic Energy Act.

8.2 RCRA AND/OR TSCA WASTE CHARACTERIZATION/CERTIFICATION

Waste that is considered as hazardous waste must be characterized before being transferred to ESWMO. The following information must be certified by the generator as a condition of characterization:

1. process knowledge;

2. sampling and analysis methods;

3. RCRA constituents present in the waste;

4. pH or corrosivity to steel, for an aqueous waste matrix, the pH must be reported (For a nonaqueous liquid waste matrix, the corrosivity to steel must be determined by the method described in 40 *CFR* 261.22 and reported.); and

5. identified as hazardous if they exhibit any of the characteristics identified in 40 *CFR* 261 Subpart C. These characteristics are

   Ignitability - as defined in 49 *CFR* 261.21. Includes liquids with a flash point of less than 140°F; nonliquids that can cause fires through friction, absorption of moisture, or spontaneous chemical changes at standard temperature and pressure; ignitable compressed gases as defined in 40 *CFR* 173.300; and oxidizers as defined in 49 *CFR* 173.151.

   Corrosivity - as defined in 40 *CFR* 261.22. Includes liquids with a pH less than or equal to 2 or greater than or equal to 12.5 and liquids that corrode steel at a rate of >6.35 mm (0.25 in.) per year at a test temperature of 55°C (130°F).

   Reactivity - as defined in 40 *CFR* 261.23. The waste material is normally unstable and readily undergoes violent change without detonating; reacts violently or forms potentially explosive mixtures with water; when mixed with water generates toxic gases, vapors, or fumes; is a sulfide- or cyanide-bearing waste, which when exposed to pH conditions

between 2.0 and 12.5, can generate toxic gases or fumes; is capable of detonation or explosive reaction if subjected to a strong initiating source or if heated under confinement; is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure; or is a forbidden explosive, Class A explosive, or Class B explosive as defined in 49 *CFR* Parts 173.51, 173.53, or 173.88, respectively.

Toxicity - as defined in 40 *CFR* 261.24: A sample of the waste demonstrates the potential for toxic materials to leach from the waste under controlled laboratory conditions. Toxic contaminants include arsenic, barium, cadmium, chromium. lead, mercury, selenium, silver, certain pesticides, and organics at specified concentrations.

6. reporting the concentration in parts per million (ppm) for PCBs;

7. identifying the TSCA regulated constituents present in the waste;

8. reporting the concentration of the source material;

9. reporting waste containing beryllium, the quantity of beryllium must be reported in grams if the waste is solid and in parts per million if the waste is liquid; and

10. reporting all applicable EPA waste codes.

Additional requirements include

1. packaging and labeling requirements for the site on which the waste originates shall be met and

2. documentation supporting waste characterization.

8.3 RCRA MIXED AND/OR TSCA RADIOACTIVE WASTE CHARACTERIZATION/CERTIFICATION

The following documentation must be provided for certification:

1. all radioisotopes and quantity of each, present in the waste;

2. RCRA constituents and all applicable codes must be identified;

3. TSCA-regulated constituents present in the waste must be identified;

4. waste containing PCBs, the concentration in ppm must be reported;

5. waste containing beryllium, the quantity of beryllium must be reported in grams if the waste is solid and in ppm if the waste is liquid;

6. all applicable EPA waste codes;

7. for an aqueous waste matrix, the pH must be reported. For a nonaqueous liquid waste matrix, the corrosivity to steel must be determined by the methods described in 40 *CFR* 261.22 and reported; and

8. physical form of the waste must be identified.

Additional requirements include the following.

1. Criticality Safety and Health Physics requirements for the site on which the waste originates shall be met.

2. Packaging and labeling requirements for the site on which the waste originates shall be met.

3. Documentation supporting waste characterization may be required.

9. ORNL WASTE MANAGEMENT/DISPOSAL GUIDELINES

ER field personnel and subcontractors who generate and manage radioactive or hazardous waste or transfer this waste to ESWMO are required to comply with state, federal, and applicable Energy Systems procedures concerning waste management and training documentation. These regulations and procedures are intended to ensure that all generated waste is properly managed and disposed. Limited disposal capacities at ORNL and other non-Energy Systems facilities and increased emphasis toward protection of our environment mandate waste reduction. Planning waste minimization into all ORNL ER waste generating activities is mandatory.

9.1 SOLID LOW-LEVEL RADIOACTIVE WASTE

All generators of SLLW are required to review applicable updates of WACs. The following is in accordance with current WAC guidance documents but should not be use in lieu of the actual WAC. SLLW is defined as waste containing beta-gamma activity and/or nonfissile alpha activity (in concentrations $<1 g/ft^3$ or $<1 g$ total and TRU radionuclide concentrations less than or equal to 100 nCi/g) and is not classified as high-level waste, TRU waste, or spent fuel. All SLLW must be completely dry and contain no chemically hazardous or RCRA materials. Dry residues obtained by evaporation during organic and inorganic radiochemical experiments may be disposed of as SLLW if they are not EPA listed and do not exhibit any characteristics of hazardous waste (i.e., toxic, reactive, corrosive, ignitable). The generation of radioactively contaminated chemical liquid wastes should be avoided.

Radioactive SLLW is considered either compactible or noncompactible.

Compactible SLLW is disposed of by the generator into yellow LLW dumpsters or other containers as deemed appropriate by ESWMO. Compacting is the most cost-effective method to dispose of SLLW. Compactible waste consists of radioactively contaminated material such as paper, plastic, cloth, rubber, small wood, and lightweight metal items. High-efficiency particulate air filters and empty radioactive glass jugs are authorized. All compactible waste must be contained sufficiently to present no personal injury hazard during handling of the waste packages.

Compactible SLLW must be contained in double 4-mil-thick polyethylene plastic bags with magenta radiation markings. Once sealed and closed, the bagged package is normally suitable for transport to an approved yellow SLLW dumpster. If the waste material is contaminated with pure beta emitting isotopes, the surface dose rate must be measured before being placed in plastic bags and must be <100 mrem/h beta in its unshielded container. Once placed into plastic bags for compactible disposal, the surface dose rate must be <10 mrem/h beta. If the waste material is contaminated with beta-gamma emitting isotopes, the surface dose rate measured through the plastic bags must be less than or equal to 200 mrem/h beta-gamma. Once sealed for compactible disposal, the outer surface of the package must be <20 dpm alpha and <200 dpm beta-gamma transferrable contamination. A compactible waste tag (form UCN 13075) must be completed and attached to the outer container of each

compactible waste bag or packet. When unattended by the waste generator, the noncompactible waste outer container must be either locked or bolted closed to ensure no unauthorized access.

Noncompactible SLLW is disposed by the generator into 55 gal steel drums, 4 ft × 4 ft × 6 ft steel boxes, or other specially authorized containers. Noncompactible waste consists of radioactively contaminated material such as metal and relatively heavyweight items of sufficient size or weight, which prevents placement into dumpsters. Probe readings must be taken on metal and other items that have contamination only on the surface and not throughout the waste item. These readings must be of the unpackaged (unwrapped, unbagged, untapped, etc.) waste items surface.

Noncompactible waste must be packaged in at least one layer of 4-mil plastic and sealed with tape before placement into an approved steel drum or box. Items too large or which cannot be disassembled to fit into standard noncompactible drums or boxes must be double wrapped in 4-mil plastic and taped securely. The maximum surface dose rate of a noncompactible outer container must be less than or equal to 200 mrem/h beta-gamma. If the waste material is contaminated with pure beta-emitting isotopes, the surface dose rate must be measured before being placed in plastic bags and must be <200 mrem/h beta. If beta waste cannot be surveyed before placement into plastic bags, the waste must be packaged as high range waste even if the dose rate on the surface of the bag is <200 mrem/h. Contact the ORNL ER WC for advance directions if this situation is expected to be encountered. Once placed in service, each waste drum, box, or package must be labeled by radiation protection personnel with a radiation tag (form UCN 2785) and assigned a container identification. Label each container to indicate building and room of origin and in service start date (i.e., 4500S-S259-010193). When unattended by the waste generator, the noncompactible waste outer container must be either locked or bolted closed to ensure no unauthorized access. Each container custodian is responsible for unauthorized material found in his or her noncompactible waste. Once sealed for disposal, the outer surface of the noncompactible container must be checked and noted <20 dpm alpha and <200 dpm beta-gamma transferrable contamination by a radiation protection representative.

Refer other questions concerning SLLW disposal or minimization methods to the WC or WM.

9.2 LIQUID LOW-LEVEL RADIOACTIVE WASTE

LLLW is generally a radioactive liquid that does not have a total radionuclide concentration exceeding 2 Ci/gal, does not exhibit any characteristic of hazardous waste, and is not a dilution of a pure EPA-listed material. Solutions containing TRU isotopes or ^{233}U must not exceed a concentration of 100 nCi/g. The Nuclear Safety Reviews require generators to show by sampling or process knowledge that (1) no fissile materials are in the waste or (2) any fissile materials are denatured as follows: (a) 100g U-238 /g U-235, (b) 100g U-238/g U-233, and (c) 100g TH/g PU.

Other restrictions also apply to fissionable isotopes of uranium and transuranics. Refer to the WAC for the LLLW system before planning disposal of fissionable waste.

9.2.1 Waste Acceptance Criteria for the LLLW System

Radioactively contaminated liquid wastes at ORNL are generated by various activities within the research and operating divisions. These activities include radiochemical processing, routine hot cell operations and decontamination, and various waste treatment and environmental protection processes. The LLLW systems consists of an underground collection and transfer system, the LLLW evaporator, and the Melton Valley Storage Systems. Much of the collection and transfer system has been taken out of service due to the Federal Facilities Agreement, requiring many generators to dispose of their LLLW via either bottling or tanker truck. More information on bottling and trucking of LLLW may be found in the following procedures:

WM-LGWO-608.2 for the 400 gal dumpster tank;
WM-LGWO-608.3 for 1000 gal tanker trucks; and
WM-LGWO-608.6 for 2.5 gal polyethylene bottles.

Local LLLW hot drains are not available at most ORNL ER sites. For sites where access to LLLW drains is not available, each site should provide a compatible bottle for interim collection of LLLW. All LLLW solutions must be cooled to room temperature before disposal. Halogen acids (i.e., Hydrochloric acid) may not be disposed of into the LLLW system. Halogenated salts may only be disposed of when permission is granted by the ORNL Liquid Waste Certification Officer, if the pH of the solution is >10, and if an equal volume of deionized water is flushed after disposal (applies to LLLW drains only). Total dissolved and suspended solids should be precipitated and filtered from the waste solution before disposal.

Non-RCRA/TSCA organic solvents or organic chemicals contaminated with radioactivity may be discharged to the LLLW drains provided the primary hazard of concern is radioactivity. Sanitary waste must not be discharged to the LLLW system unless a medical emergency exists.

LLLW that contains RCRA and/or TSCA hazardous materials should not be discharged to the LLLW system (unless a waiver is granted through the Liquid Waste Certification Officer) but should be transferred to the Hazardous Waste Operations Group (HWOG) for storage until its ultimate disposition is determined. The surface of the LLLW container must read less than 10 mrem/h to be accepted by HWOG.

LLLW must be disposed of in compliance with ORNL, EPA, and state of Tennessee regulations.

9.2.2 Acceptable Alternatives for Disposal of LLLW

1. Disposal of LLLW into an approved LLLW drain; if ORNL LLLW WAC is complied with, no further documentation or notification is necessary before disposal.

2. Local bottling then transfer of LLLW to the ORNL evaporation facility; refer to the ORNL LLW Certification Officer Bottling Procedure.

Refer other questions concerning LLLW disposal or minimization methods to the Liquid Waste Certification Officer.

9.3 WAC FOR THE PROCESS WASTE TREATMENT PLANT

The Process Waste Treatment Plant provides treatment for wastewater potentially contaminated with low levels of radionuclides. The Process Waste Treatment Plant will not remove organic contaminants (volatile or nonvolatile, water soluble or insoluble) from wastewater. Table 1 lists the specific contaminants and the maximum concentrations that have been successfully treated at the Process Waste Treatment Plant. Waste with higher radiological levels than those listed should be discharged to the LLLW system.

Table 1. Maximum allowable concentrations of specific wastewater contaminants for discharge to the publically owned treatment works

Contaminant	Concentrations
Radionuclides	
Gross alpha	175.0 Bq/L
Gross beta	10,000.0 Bq/L
^{90}Sr	10,000.0 Bq/L
^{137}Cs	400.0 Bq/L
^{60}Co	185.0 Bq/L
$^{Eu}152$	740.0 Bq/L
$^{Eu}154$	740.0 Bq/L
$^{Eu}155$	3700.0 Bq/L
^{106}Ru	222.0 Bq/L
$^{95}ZrNb$	1480.0 Bq/L
Metals	
Ag	0.4 mg/L
As	40.0 mg/L
B	40.0 mg/L
Ba	120.0 mg/L
Be	0.2 mg/L
Cd	0.3 mg/L
Cr	7.5 mg/L
Cu	2.5 mg/L
Fe	500.0 mg/L
Hg	0.004 mg/L
Ni	65.0 mg/L
Pb	30.0 mg/L
Sb	65.0 mg/L
Se	15.0 mg/L
Zn	60.0 mg/L
Others	
Chlorine (Cl_2)	20.0 ppm
Cyanide (CN)	0.2 ppm
Nitrate (NO_3)	10.0 ppm
Oil and Grease	100.0 ppm
pH	>6.0
Phosphate (PO_4)	5.0 ppm
Sulfate (SO_4)	3000.0 ppm
Total organic carbon	50.0 ppm
Total suspended solids	1000.0 ppm
Total toxic organic	100.0 ppm

9.4 WAC FOR THE NONRADIOLOGICAL WASTEWATER TREATMENT PLANT

The Nonradiological Wastewater Treatment Plant is designed to treat nonradiological process wastewaters generated at ORNL to pollutant levels acceptable under restrictions imposed by the effluent limits of best available technology regulations of the EPA, according to goals established by the Clean Water Act. The composition of waste streams to be sent to the Nonradiological Wastewater Treatment Plant must meet the criteria given in Table 2. If the concentration of any of the contaminants exceeds that given in Table 2 or if there are contaminants in the waste that are not listed in the table, contact the Liquid Waste Certification Officer to determine the best disposal practice for the waste.

Table 2. Waste Acceptance Criteria for the Nonradiological Wastewater Treatment Plant

Contaminant	Maximum wastewater concentration (mg/L)
Silver (Ag)	0.007
Arsenic (AS)	35.0
Boron (B)	35.0
Barium (Ba)	100.0
Beryllium (Be)	0.16
Cadmium (Cd)	0.01
Chromium (Cr)	3.3
Copper (Cu)	0.1
Iron (Fe)	330.0
Mercury (Hg)	.004
Nickel (Ni)	11 0
Lead (Pb)	30.0
Antimony (Sb)	60.0
Selenium (Se)	15.0
Zinc (Zn)	45.0
Chlorine (Cl)	20.0
Cyanide (Cn)	0.2
Nitrite (NO_3)	10.0
Oil and Grease	100.0
pH	>6.0
Sulfate (SO_4)	3000.0
Total Organic Carbon (TOC)	50.0
Total Suspended Solids (TSS)	1000.0
Total Toxic Organics, (TTO)	100.0

9.5 DISPOSAL OF RADIOACTIVE BIOLOGICAL WASTE

Biological waste is considered any animal tissue or materials containing animal cell residue. Radioactive biological waste is generally carcasses, bedding, or extract contaminated with <1g equivalent of ^{235}U or the concentration must be <1g/ft^3 ^{235}U equivalent.

Biological waste must be stored frozen until removed for final packaging and burial or incineration. Biological waste disposal must be prearranged by the WC to ensure delivery for disposal while frozen. The WC will coordinate waste management activities between the waste generator, Radiation Protection, and WMO. The waste generator must have completed the proper paperwork for waste to be transferred to ESWMO. Upon WC approval, frozen biological waste is double-bagged and sealed inside a metal can by the waste generator. The container is immediately checked, and a radiation tag (UCN 2785) is affixed by the radiation protection representative. Transferable contamination on the exterior of the outer container must be <20 dpm alpha and <200 dpm beta-gamma. The maximum surface dose equivalent rate of an unshielded waste container shall be less than or equal to 200 mrem/h. If radiation levels are over the limit, special arrangements shall be made with the RSWO.

There are no specific types of containers required for biological waste, except for sewage treatment plant sludge. The container shall meet the general requirements of *Radioactive Solid Waste Disposal at SWSA 6* (ORNL WMRA et al. 1994). The total weight of a package of a frozen biological waste shall not exceed 35 lb. Sewage treatment plant sludge shall be placed in a 4 ft × 4 ft × 6 ft metal box.

Refer other questions concerning radioactive biological waste certification methods to the WC and ESWMO.

10. WASTE MINIMIZATION

The pollution prevention (waste minimization) philosophy of ER reflects the policies of DOE and EPA. These policies establish a hierarchy for pollution prevention activities that will ensure

1. source reduction (reducing waste generation at the source);
2. recycling and reuse (use of materials to prevent the generation of waste);
3. treatment (reduction of volume, toxicity, and mobility of the waste);
4. disposal in an environmentally safe and economical manner;
5. segregation of hazardous from radioactive constituents;
6. substitution of nonhazardous materials for hazardous materials;
7. minimizing the volume of materials entering contamination areas; and
8. training of personnel on pollution prevention techniques, procedures, and policies.

The ER Program is firmly committed to ensuring incorporation of pollution prevention activities as part of its program. The reduction of waste at the source, as well as developing recycling strategies for specific waste types, will be implemented when possible.

Waste minimization is interpreted by EPA as source reduction and recycling. Waste minimization does not include the transfer of pollutants from one medium to another. Options for source reduction should be exhausted first. When the examination of source reduction options is complete, alternatives for recycling should then be pursued.

Source reduction is the minimization or elimination of waste at the source, usually within the production process or maintenance operation. Source reduction is intended to avoid the generation of hazardous waste by substituting nonhazardous materials in the process stream.

Recycling refers to the effective use or reuse of a waste as a substitute for a commercial product or to the use of waste as an ingredient or feedstock in an industrial process. It also refers to reclaiming useful constituent fractions within a waste material or removing contaminants from a waste to allow it to be reused. Recycling implies use, reuse, or reclamation of a waste after it is generated by a particular process.

When the generation of waste cannot be avoided, ER is committed to recycling and treatment of waste in ways that minimize the undesirable effects on air, water, and land. The following sections list some methods that may be employed in waste minimization.

10.1 WASTE MINIMIZATION TECHNIQUES

10.1.1 Sampling/Drilling Equipment

Equipment of smaller diameter that accomplishes the same goals as equipment of larger diameter should be used. For example; equipment such as the GeoProbe (uses 1.5 in. diameter sampling rod) and is hydraulically driven. The GeoProbe is used to collect soil and soil gas and to install monitoring well samples. It eliminates soil cuttings and will not generate waste (i.e., may generate some decontamination fluids). The GeoProbe, which is mounted on the back of a vehicle, is driven by the weight of the vehicle and a hydraulic hammer and displaces the soil. The GeoProbe will not penetrate bedrock but may penetrate asphalt.

10.1.2 Drive Point/Well Point

Drive point has been used to input piezometer wells for studying groundwater flow and elevations. Well point installation is conducted using direct driving techniques and a 1.75-in. steel casing that is hammer driven. This technique for installing piezometer wells and taking shallow soil samples will reduce the amount of surplus soil normally generated during well installation and sampling activities.

10.1.3 Mobile Decontamination Trailer

The Mobile Decontamination Trailer is used to decontaminate sampling and well drilling equipment such as auger flights and split spoons. The Mobile Decontamination Trailer uses aluminum silicate as the abrasive material in the water to clean equipment. The decontamination fluid is recirculated through a closed unit and, therefore, does not generate any unnecessary waste. (See Appendix B for criteria for use of the well drilling steam cleaning area.)

10.2 TECHNOLOGY ALTERNATIVES

1. Solidification is a process used to reduce waste volume by mixing the waste with a solidification agent or binder.

2. Dewatering is the process of pumping away all drainable liquid. Other methods used are crystallization, incineration, and compaction.

3. Equipment: drilling, piping, or layout changes— An example of an equipment change would be the use of a GeoProbe hydraulic drilling unit as opposed to Air Rotary or Hollow Stem Auger Flight drilling methods. The GeoProbe unit controls sample volume and eliminates drill cuttings, thereby reducing the amount of soil potentially generated as waste, as well as all drilling fluids.

4. Additional automation may be utilized to reduce the number of process steps, eliminating waste generation in each of these steps. It may also reduce waste handling, which could eliminate PPE waste.

5. Changes in operational settings, such as adjustments in flow rate, pressure, and temperature can result in waste reduction.

10.3 MATERIAL SELECTION

Material substitution involves the reduction, replacement, or elimination of hazardous materials in processes. This control technique consists of replacing a toxic or hazardous material with an appropriate, less toxic or hazardous material.

Material purification involves the filtering or purifying of materials, which can be accomplished by purchasing filtered or purified materials or processing them on-site. Some of the most common solvents have small amounts of impurities that cause the entire material to be considered as a hazardous waste.

10.4 GOOD OPERATING PRACTICES

The following practices should be instituted to support waste minimization.

1. Restrict material entering Radiological Buffer Areas to those needed for performance of work.

2. Segregate known uncontaminated waste from potentially contaminated waste.

3. Emphasize training in waste reduction philosophies, techniques, and improved methods.

4. Routine inspections and spill prevention are to be encouraged.

5. Technical and administrative controls should be established to minimize the volume of mixed waste generated and the amount of radioactive waste generated.

6. A water management program should be maintained to identify, trend, and eliminate unnecessary sources of radioactive liquid waste. This program should include aggressive measures to identify and repair leaks.

10.5 PRODUCT SELECTION

1. Product substitution includes the substitution of nonhazardous products in place of hazardous products.

2. Product conservation—Reduction in the amount or concentration of a material through proper management is also effective.

3. Change in product composition—Changes in product composition, such as the removal of unnecessary hazardous ingredients, will reduce the amount of material classified as hazardous.

10.6 RECYCLING TECHNIQUES

10.6.1 Reuse

1. Raw materials may be returned to the original process through the use of filtering or reclamation action.

2. Raw materials may be substituted for another process, such as waste from one process used as a substitute in another process.

10.6.2 Reclamation

1. Materials can be processed for resource recovery and reused.

2. Materials can be processed for use as a by-product either as is or reclaimed and blended for reuse.

10.7 OTHER TECHNIQUES

Other techniques for waste minimization involve housekeeping, volume reduction, decontamination, waste size reduction, waste treatment, and dynamic compaction (if applicable).

10.7.1 Housekeeping

Keeping work areas neat and orderly is an effective waste minimization technique closely linked with other techniques, such as loss prevention and contamination control. When access ways and work areas are kept free of obstructions and debris, the spread of contamination is minimized. The control of pedestrian traffic and vehicular and equipment movements to noncontaminated rights-of-way will also reduce the inadvertent contamination of adjacent areas.

10.7.2 Volume Reduction

At nonoperational facilities, techniques to minimize waste through volume reduction are generally intended to reduce the volume of existing wastes rather than the reduction of the waste to be generated. In some instances, however, some of these techniques can be applied during site remediation to reduce waste generation.

In many cases, the efficiency of reducing the volume of hazardous, radioactive, and mixed waste can be optimized by combining minimization techniques. The possibility of combining techniques should be considered when preparing the waste minimization plan for a site. Decontamination and size reduction strategies to reduce the volume of wastes are applicable to the wastes.

10.7.3 Contamination Control

Contamination control involves protecting equipment, personnel, and machinery from excessive contact with hazardous or radioactive materials. Such controls are applicable during

decontamination or excavation activities. If equipment used during remediation activities has been contaminated to a point where it is no longer usable, or to a point where the contamination level cannot be reduced to acceptable safe limits, it requires secure disposal. When equipment and personnel contamination is minimized, waste volumes and, disposal costs are minimized. As examples, decontamination activities are conducted in bermed areas, and excavated material is containerized on designated, plastic-lined areas. These measures control and minimize the spread of contamination to other areas. Other methods of contamination control are listed here.

- Scabbing and scarifying—The scabbing and scarifying processes use specialized equipment to remove the top layer of contaminated material. Surfaces are scanned for radioactive contamination to determine the amount of material that needs to be removed. The equipment is useful in minimizing the amount of waste generated, because the amount of material removed can be easily controlled and limited, thereby reducing the total waste requiring disposal.

10.7.4 Decontamination

Decontamination efforts will be conducted so as to prevent the spread of contamination and minimize the amount of waste generated. Typical precautions will include the use of diked areas, ground cover materials (e.g., plastic) and waste receptacles to incur contaminant. Other minimization efforts include the following:

1. Radiological Work Permits or other technical work documents should include provisions to control contamination at the source to minimize the amount of decontamination needed.

2. Water and steam are the preferred decontamination agents. Other cleaning agents should be selected based upon effectiveness, hazardous properties, amount of waste generated, and ease of disposal.

10.7.5 Waste Treatment

Waste treatment can be used to reduce the volume, toxicity, or mobility of generated or existing wastes. There is currently very limited national capacity for the disposal of radioactively contaminated and hazardous waste. For this reason, mixed waste present at sites should be evaluated for treatment of hazardous components before disposal. The following are some technologies that may apply to ER activities.

10.7.5.1 Thermal treatment (incineration)

Incineration is an engineered process that employs decomposition via thermal oxidation at high temperature (usually 900°C or greater) to destroy the organic fraction of the waste and reduce volume. Several different types of incinerators are available for waste destruction (e.g., rotary kiln, fluidized bed, liquid injection, and controlled air incinerators). EPA considers incineration to be the best demonstrated accepted technology for the destruction and disposal of combustible hazardous and toxic wastes.

10.7.5.2 Solvent extraction

Solvent extraction usually refers to two different types of processes. One, which is also known as liquid-liquid extraction, is the separation of constituents from a liquid solution by contact with another, immiscible liquid in which the constituents are more soluble. (If the constituent to be separated is ionic, the process is called liquid ion exchange.) The other, which is also known as leaching, is the separation of constituents from solids by contact with a liquid in which the constituents dissolve. This technology is acceptable for the treatment of hazardous and radioactive wastes.

10.7.5.3 Fluoboric acid treatment

This technology was designed specifically for D&D, using fluoboric acid (HBF_4) in dipping baths, loop systems, or by spraying. It attacks nearly every metal surface and metallic oxide or concrete surface. It removes oxide and contaminated outer layer surfaces in a controllable, uniform, and efficient manner.

10.7.5.4 Vitrification

This device adds glass-forming constituents to waste feed to produce a pool of molten glass at the bottom of a reactor in which solid wastes react. Gases produced during combustion are released from the surface of the of the glass pool. Ash remains in the pool and is periodically removed with the carrier glass matrix. The removed glass is collected in storage containers and solidifies upon cooling.

For additional information on treatment technologies, see *Oak Ridge National Laboratory Technology Logic Diagram (TLD)*, Vols. 1, 2, and 3 (Energy Systems 1993). This document was developed to provide a decision support tool that relates ER and WM problems at ORNL to potential technologies that can remediate these problems. The TLD can be obtained from the Office of Scientific and Technical Information.

11. PERSONNEL TRAINING REQUIREMENTS

All personnel involved in ORNL ER activities are subject to training requirements as specified by Energy Systems procedures and policies. Training requirements shall be determined by the ESWMO and any specific requirements by ER for the site. Some examples of training that may be required are listed in this section. At a minimum, all individuals performing any of the functions described in this programmatic WM Plan shall be trained as it relates to that part of the plan (s)he will be implementing. WCs must attend Waste Certification Program training as developed by ESWMO.

Waste Generator Training for SLLW. This course covers programmatic requirements for generator certification of SLLW. It also provides the generator with an understanding of the SLLW WAC and the process for the documentation and packaging of SLLW. This course is a requirement for all generators and packagers of SLLW.

Hazardous Waste Characterization. This course provides the generator with necessary information and resources to properly characterize hazardous and mixed wastes at ORNL.

Waste Generator Training for Satellite Accumulation. This course provides an overview of the RCRA requirements of hazardous waste and ORNL guidelines for satellite accumulation. This course is required for all operators or supervisors of satellite areas.

Waste Generator Training for 90-d Accumulation Areas. This course provides an overview of RCRA and ORNL requirements for persons operating 90-d accumulation areas. This course is required for anyone operating a 90-d accumulation area.

Waste Generator Training for Transuranic Waste. This course provides the TRU waste generator with an understanding of the TRU WAC and the process for documentation and packaging of TRU waste at ORNL. This course is required for all packagers and generators of TRU waste.

ORNL Radiation Worker II. This course details the fundamentals of radiological control principles as well as extensive time devoted to practical considerations, including dress-out, frisking contamination control, emergency preparedness, and lessons learned. This course is required for all personnel that may be required to use PPE in a radiological area.

Positive Physical Controls to Prevent Diversion of Construction Wastes. This course is a refresher program provided to all truck drivers (including temporary drivers) by ESWMO on employee awareness to address how waste material must be managed. This course was developed as a joint effort between Energy Systems and MK-Ferguson as result of a construction project at the Y-12 Plant.

Forty-Hour Superfund Amendments and Reauthorization Act/Occupational Safety and Health Administration Training. This course addresses the requirements of 29 *CFR* 1910.120 for workers engaged in hazardous waste activities or other activities that may be applicable to 29 *CFR* 1910.120.

Waste Certifier. This course is required for all personnel that will serve as WCs.

ER-Based Waste Management Training. As implemented, specific waste management training will be required as agreed upon by the ER Program.

All individuals generating SLLW or any other applicable waste type must be trained against the WCP and WAC.

12. ER WASTE MANAGEMENT OPTIONS

ER field personnel, prime contractors and subcontractors to ER who generate package or transfer waste to ESWMO for TSD are required to comply with the guidelines of this procedure and applicable regulatory and ESWMO procedures. These guidelines are intended to ensure that all generated waste is properly managed in a manner that is protective of human health and the environment.

As part of ORNL's best management practices, wastes will be managed according to established regulatory and Energy Systems requirements. The waste also will be managed so that it will not adversely impact ESWMO's operations, and incur unwarranted cost.

12.1 WASTE STAGING AREA

A waste staging area will be used to store liquid and solid IDW and non-IDW, by means of segregation and consolidation, until further characterization is performed. The staging area also will be used to store RCRA (generated in an IDW process) contaminated liquids and solids. Additionally, decontamination activities may be performed in this area (as applicable).

The waste staging area may contain all types of waste (soil, PPE, etc.) from different ER activities. The waste will be managed to protect human health and the environment, while meeting the intent of established regulatory and Energy Systems requirements.

Wastes stored in the staging area are to be protected against the elements (corrosion protection, etc.). All containers must be properly labeled unless a waiver has been granted for like wastes types stored in the same area.

Wastes may also be temporarily located in an approved RCRA Satellite Accumulation or 90-d Accumulation Area. The Satellite Accumulation area is limited to a total waste volume of 55 gals, or no more than 1 quart of EPA listed acutely hazardous waste. As a best management practice, characteristics wastes should not be mixed with EPA listed wastes. Refer to the ORNL Satellite/90-d Accumulation Area Training Manuals and the following list to determine if your waste is specified.

1. Consult with Health Physics and Environmental Compliance before generating any waste material that may be placed in a Satellite Accumulation/90-d accumulation area. If the waste contains radioactive contaminants, it must be disposed of as mixed waste. Generation of RCRA mixed waste is strongly discouraged at ORNL. Extreme care should be exercised to avoid contact of RCRA hazardous with radioactive materials.

2. Perform all waste transfers into storage containers in an adequately ventilated area to eliminate personnel exposures.

3. All hazardous waste stored in a Satellite Accumulation/90-d accumulation area must be maintained in a safe and stable condition. Keep waste containers closed at all times except while adding or removing waste in satellite storage. Each leak free chemical

container must be compatible with its contents and must be packaged to ensure the integrity of contents during transport to the ORNL waste storage facility. Where possible, waste should be collected in unbreakable containers that are suitable for transport. If glass containers are necessary, they must be additionally contained (i.e., double bagged) before release for transport. Be sure that all information concerning the transport of waste is kept on the Satellite Accumulation/90-d accumulation area log sheets. Hazardous waste that is generated as part of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process (IDW) must be managed as RCRA waste with the exception of the 90-d storage restriction.

4. Sufficient secondary containment must be provided to prevent release in the event of primary containment failure. Chemically resistant photographic trays may be used as secondary containment. If an accumulation area is located near a floor drain, the drain must be sealed closed (leak free) to prevent release in the case of accidental spillage.

5. Separate reactives to ensure materials may not come in contact with each other in the event of unexpected leakage.

6. A record of each container of hazardous material placed into the Site Accumulation/90-d accumulation area is required. This record must identify all known constituents and volumes of the waste placed into the areas. Each container should be labeled with a description of the contents. An item number must have corresponding entry on the RFD form. Packages containing identical waste materials (constituents) should be assigned identical item numbers. The total number of containers for a particular item number will be reflected on the RFD form.

7. Before waste pickup by the HWOG, an appropriate tag must be affixed to each waste package by radiation protection personnel and a barcode should be attached to the RFD form and the package.

8. Transmit the top copy of the RFD form to HWOG (Bldg. 3001, MS-6029, 4-7467). Once forms have been reviewed and approved, waste will be removed from the Satellite Accumulation/90-d accumulation area by waste operations personnel.

12.2 WASTE CONSOLIDATION AREA

The Waste Consolidation Area (WCA) will be used to compile soils that are potentially contaminated. Guidance on managing this area is provided in the EPA ruling on managing waste on CERCLA sites. No spoils will be placed in this area that cannot be managed in a manner that is protective of personnel and the environment. To use the WCA, consider the following procedures.

1. Liquids will be pumped from containment boxes and drums and stored in a waste staging area (if applicable), and a drying agent is to be applied to slurry to absorb free liquids. Before absorption, natural evaporation should be allowed.

2. Solids will be placed on a high-density polyethylene lined/diked area, and a tarp will be utilized to cover the material.

3. Sandbags will be utilized to secure the tarp cover.

4. Any spoils measuring >5 mrem/h will have to be approved by Health Physics before being placed on the liner.

5. The boundaries of the WCA is not to exceed 2.5 mrem/h, unless granted by Health Physics.

6. Appropriate Health Physics identification systems to denote radiation hazards such as signs, tags, labels, ropes, or chains will be placed around the perimeter of the WCA.

7. Information on contamination levels and the exposure rates shall be kept current.

8. Entry requirements will be posted.

9. All personnel exiting WCAs containing radioactive waste will be required to frisk upon exit of the area.

10. Weekly log inspections of the area will be performed (if activities are ongoing) but may be waived to once monthly if conditions in the area have not changed and there are no ongoing activities where waste is being added to area.

11. The project manager and the WC is responsible for keeping records of waste types, volume, and the area from which waste was generated.

12.3 AREA OF CONTAMINATION

The AOC is delineated by the areal extent (or boundary) of contiguous contamination. Such contamination must be continuous but may contain varying types and concentrations of waste. The AOC may be extended to all suitable areas close to the contamination that may be necessary for the implementation of the response action. Depending on the site characteristics, one or more AOCs may be delineated. Some requirements for AOCs are the following:

1. ensuring that as much waste as is suitable is managed in the AOC (done by the project manager or designee);

2. ensuring compliance with applicable or relevant and appropriate requirements;

3. minimizing the quantity of waste generated during field investigation or sampling;

4. determining if IDW is a RCRA hazardous waste and subject to the land disposal restriction;

5. complying with proper storage requirements according to CERCLA, RCRA, and Energy Systems requirements;

6. identifying waste not expected to be returned to the AOC using the best professional judgment based on site history, field screening, and surveying results;

7. labeling, containerizing, and marking waste not expected to be returned to the AOC in accordance with WM procedures;

8. maintaining auditable records of samples taken from containers of waste and shipped for analysis as part of the project record file;

9. transporting hazardous waste that is removed from the AOC to a TSD facility according to DOT, DOE, federal, state, and Energy Systems requirements;

10. managing soil and water that are returned to the AOC in a manner that prevents surface water contamination from runoff, and be protective of personnel safety and the environment; and

11. managing IDW, which should be considered part of the site, with other wastes from the site, consistent with the final remedy.

Please refer to "*Management of Waste Generated from Field Investigation and Sampling Activities*" (Energy Systems 1994) for further direction managing waste in the AOC.

12.4 IDW MANAGEMENT OPTIONS

Soil

Generation Processes: Well/test pit installation, borehole drilling, soil sampling

Management Options: (1) Return to boring pit, use dynamic compaction (if applicable) or source immediately after generation, (2) spread around boring, pit, or source within the AOC, (3) consolidate in a pit (within the AOC), (4) send to on-site TSD, (5) send to off-site TSD immediately, (6) store for future treatment and/or disposal.

Sludges/Sediments

Generation Processes: Sludge pit/sediment sampling

Management Options: (1) Return to boring pit, or source immediately after generation, (2) send to on-site TSD, (3) send to off-site TSD immediately, (4) store for future treatment and/or disposal.

Aqueous liquids (groundwater, surface water, drilling fluids, other wastewaters

Generation Processes: Well installation/development, well purging during sampling, groundwater discharge during pump tests, surface water sampling.

Management Options: (1) Discharge to surface water, (2) pour onto ground close to well (nonhazardous waste), (3) send to on-site TSD, (4) send to off-site commercial treatment unit, (5) send to the publically owned treatment works, (6) store for future treatment and/or disposal.

Decontamination fluids

Generation Processes: Decontamination of PPE and equipment

Management Options: (1) Send to on-site TSD, (2) evaporate (for small amounts of low contamination organic fluids), (3) send to off-site TDS immediately, (4) store for future treatment and/or disposal.

Disposable PPE

Generation Processes: Sampling procedures or other on-site activities

Management Options: (1) Send to on-site TSD, (2) place in on-site industrial dumpster, (3) send to off-site TSD immediately, (4) store for future treatment and/or disposal.

12.5 DRILLING CUTTINGS/DECONTAMINATION BASINS

Drill cuttings and decontamination waste may be contained and captured in basins. These basins are to be designed utilizing high-density polyethylene or earthen materials. All established regulatory and Energy Systems requirements are to be complied with.

12.6 STOCKPILING

Construction or remediation activities may at times warrant the stockpiling of spoils that pose no human health or environmental hazard.

Soil ["*Health, Safety, and Environmental Protection Procedure for Excavations Operations at the Oak Ridge National Laboratory*" (ORNL 1993)] that is unable to be replaced at the point of origin or to use as backfill may be placed on plastic and covered until reused as below grade fill. Radiologically contaminated soils will meet appropriate radiation safety guidelines in force at ORNL. Management of stockpile soil includes the following:

1. stockpile areas will be roped off and appropriate Health Physics signage erected;

2. soil will be placed on a high density polyethylene plastic liner and covered to prevent fugitive air emissions and erosion/runoff from occurring;

3. during stockpiling, airborne contamination will be controlled by maintaining the stockpile in a damp condition to eliminate airborne dust; and

4. if management option involves leaving the stockpiled soil in place and properly contained at the construction/remediation site, containment shall consist of placing the stockpiled soil on a plastic sheet if necessary, covering the completed stockpile with 12 in. of clean soil and sowing grass.

12.7 CONTAINERIZING AND LABELING

This section details Energy Systems, federal, and state regulatory requirements for containerizing, labeling, and transporting. Samples collected and shipped for analysis are exempt from the RCRA packaging, labeling, manifesting, and transportation requirements. Waste generated during field investigation activities may be collected, disposed of immediately, or provided with some level of interim storage management. Accordingly, until there is positive evidence that the waste is a RCRA hazardous waste, project managers must manage the waste in a protective manner but not necessarily in accordance with RCRA Subtitle C. Waste may also be stored in a container within the AOC or and returned to its source without meeting the specified Land Disposal Restrictions treatment standards. However, when the waste is disposed of off-site or transported on public roads, DOT requirements for containerization, labeling, and transporting apply.

Structural integrity and susceptibility to climatic conditions of drums, B-25 boxes, and other containers used to store liquid wastes outdoors are to be evaluated for corrosion protection. Listed below are a few items that have been used to protect waste containers subject to corrosion:

- drum cover,
- herculite sheeting,
- polyethylene sheeting,
- polyethylene drum liners,
- epoxy paint, or
- hot dipped galvanized.

Periodic inspections of all containers are to be performed to verify structural integrity of the storage unit.

12.7.1 RCRA Waste Container Requirements

RCRA hazardous waste will be placed in containers with liners that are compatible with the waste being stored and will have a secondary containment system that includes a liner, a vault, or an equivalent device.

12.7.1.1 TSCA waste container requirements

TSCA waste containers will comply with specifications in 49 *CFR* 178.2 Nonliquid PCB waste will be placed in containers that also comply with 49 *CFR* 178.

12.7.1.2 LLW container requirements

LLW will be placed in containers that are approved by the RSWO.

12.7.1.3 Mixed waste container requirements

Mixed waste will be placed in containers compatible with the waste contents and will meet the regulatory requirements for each component of the waste (see DOT regulations 49 *CFR* 178 for additional requirements).

12.7.1.4 RCRA/TSCA waste container requirements

RCRA/TSCA waste will be contained in DOT-specified containers compatible with the RCRA waste and in compliance with DOT waste container specifications for PCB waste.

12.7.2 Labeling

As a minimum, all waste generated during field activities and subsequently stored in containers shall carry a label that clearly identifies the contents of the container. The date that the waste is first placed in the container shall also be noted on this label. Additional information to include on the contents label is location, hazard class (if known), and name and phone number of contact.

In addition to the container contents label, other labeling requirements may be applicable for waste known or suspected to be hazardous or radioactive.

12.7.2.1 RCRA waste labeling

Containers on sites of known or suspected hazardous contamination shall be marked with a "RCRA Hazardous Waste" marking with the appropriate information indicated at the point of generation. The accumulation start date shall be clearly visible for inspection purposes. EPA hazardous waste code number(s) should also be posted on the label.

12.7.2.2 TSCA waste labeling

Containers holding PCB concentrations of 2 to 500 ppm and areas used to store PCBs shall be labeled according to requirements in 40 *CFR* 761. Labels shall be placed on the container so they are visible and easily read. The date the waste was first placed into the container shall be noted on the contents label. The required PCB label, which reads "Caution-Contains PCBs," is to be at least 6 in. on each side with letters and stripping on yellow or white background. Containers with concentrations of PCBs ranging between 2 and 49 ppm do not require the PCB label but must be labeled with the PCB concentration. If an article or piece of equipment is too small for the 6 in. label, reduced labels may be used as specified in 40 *CFR* 761.45.

12.7.2.3 LLW labeling

LLW is labeled in accordance with ORNL Health Physics, WMOG, DOE Order 5820.2A, and DOT requirements for radioactive waste.

13. TRANSPORTATION

The following sections describe the requirements for transporting waste from the project site for analysis, and TSD.

13.1 PREPARATION FOR TRANSPORTATION

Before transporting the waste from the project site to the TSD facility, the project manager or appropriate representative identifies a TSD facility, completes the appropriate RFD, selects a route of transport, and performs a visual inspection of the waste containers. The project manager should also contact the ORNL Transportation Office for any other requirements pertaining to the transportation of waste.

13.2 ROUTES OF TRANSPORT

The project-specific WM checklist shall describe the method of waste transfer (i.e., chain of custody) and the expected routes to be used. If waste is transported on public roads, compliance with EPA manifesting requirements and DOT regulations is necessary.

14. HEALTH AND SAFETY

Activities affiliated with waste management are discussed in the following sections.

14.1 CONTAINER MANAGEMENT AND HANDLING

Most waste receptacles encountered when working in hazardous waste areas, or throughout industrial settings, are either metal drums or large metal waste bins. Extreme care should be taken when inspecting, moving, and transporting these containers. If drums or containers are to be handled or sampled on any ER project or site, a section within the Project specific health and safety plan must be completed to ensure safe handling of these receptacles. Most receptacles are stacked, one on top of the other, not more than two drums high. A minimum distance of 3 ft shall be allowed between rows of stacked drums.

14.1.1 Drum Safety

When a drum or area of drums is approached, the safety of the situation should be accessed by careful visual observations. Are the drums stacked? Are the drums on pallets? Are they secured thus eliminating a fall or crush hazard? If a container is encountered in the field the same observations must be made to ascertain the safety of the situation. When encountering drums:

1. look for any major concerns that could indicate an extreme hazard (e.g., swelling or bulging of the lid or side);

2. notify the ORNL HWOG if an extreme hazard is observed;

3. do not touch a drum that is swollen or bulging;

4. consider and treat all drums or containers as containing hazardous material until proven otherwise;

5. inspect the container for labels, placards, or anything that might assist you in determining its contents;

6. label all drums with contents or suspected contents and keep in an area with like contaminants or hazards;

7. determine the condition of the drum and look for rust, corrosion, or leaks;

8. treat drums or other containers as shock sensitive if crystal formation is noted around the container;

9. inspect all storage areas as required and record the inspection on the proper forms; and

10. vent drums suspected of having pressure on them should be vented before opening.

Remember that improper handling or lack of concern can result in damage or injury.

14.1.2 Receiving Drums/Boxes

If drums are going to be used on a site for containerization and future disposal, protocols and procedures must be followed.

1. Newly received drums or containers should be staged in an area free of congestion and in a clean zone free of any contamination.

2. All drums should be placed on pallets for ease of transporting.

3. An drum label reading "empty" should be affixed to each drum when it arrives on-site or the drum should be placed in a specific area reserved for empty drums or boxes. This label is not to be mistaken for the label prescribed by DOT to be placed on containers purged of radioactive material.

4. Drums in service are to be placed on pallets.

5. When the drum has reached capacity, secure the bung plug or the drum's lid and attach the appropriate label to the side of the drum. The content of the drum label should include (if applicable):

   a) the site,
   b) the contents of the drum (e.g., drill cuttings, compatible waste),
   c) the date the drum was filled,
   d) the custodian of the drum,
   e) the barcode (if applicable),
   f) the disposal request number (if applicable), and
   g) the type of waste (radiological, hazardous, TSCA, etc)

The drums should be placed on pallets and arranged so the labels on the side of the drums can be easily read. The pallets should be aligned so that a forklift can access the load easily and transport the pallets to the designated staging area.

14.1.3 Drum Handling

Most injuries that result from moving or handling packed drums are a result of improper lifting and inadequate training of personnel. Specific precautions to minimize worker injury when handling drums include, but are not limited to, the following:

1. allocate appropriate time for completion of tasks,

2. determine appropriate engineering controls,

3. determine the contents of the drum and what precautions need to be taken before moving the container and sampling,

4. determine the level of PPE that would limit exposure,

5. use a hand truck especially designed for moving drums (whenever possible),

6. train personnel in proper lifting and moving techniques to prevent back injuries,

7. adhere to specific load limits (<50 lb for one person) for manual lifting,

8. use large rods rather than personnel to give leverage to containers when lifting containers on to trucks, and

9. utilize a "buddy" to help maneuver the drum into position for loading.

Additional hazards include exposure to toxic or hazardous vapors, drum lids becoming projectiles due to internal pressure buildup, or rupture of drums. Specific precautions include, but are not limited to, the following.

1. Where buried drums are suspected, conduct a geophysical survey before using any construction equipment to minimize the possibility of rupture.

2. Use a drum grappler where possible to minimize contact with drums. If a grappler is not available, pump or overpack drums of poor integrity before excavation.

3. Ground equipment before transferring wastes to new drums (if applicable).

4. Use nonsparking hand tools and nonsparking bucket teeth on excavation equipment, and use plexiglass shields on vehicle cabs.

5. Where slings, yokes, or other accessories must be used, they must meet ORNL Industrial Safety standards for hoisting equipment. After attaching the accessory, workers should move away from the work area before the drum is lifted.

6. Swollen drums should not be handled until pressure can be relieved (venting) or contents determined.

*Note: Frequently there is no swelling and no visible sign that pressure buildup has occurred.

   a. Use bars that fit over the teeth of excavation buckets to prevent drum puncture.

b. Where ionizing levels of radiation are detected, the Site Safety and Health Officer or Office of Radiation Protection representative should be contacted; generally, the drum should be overpacked and isolated promptly.

c. Where pressure buildup or explosive or shock-sensitive material is suspected, every effort should be made to handle the drum remotely.

d. Use direct-reading air monitoring equipment (e.g., combustible gas indicator, organic vapor analyzer, lower explosive limit meter, photoionization detector, flame ionization detector, or calorimetric indicator) when in close proximity to drums or other suspect containers to detect any hazardous chemical environments.

14.2 SITE COMMUNICATION

Personnel responsible for managing waste containers are required to have some form of site communication that will allow them to report emergencies to the appropriate personnel and communicate back to the office. Communication systems used may be two-way radios, cellular telephones, plant telephones, or access to telephones on the work site.

14.3 SANITATION

14.3.1 Housekeeping

All AOCs and waste staging areas shall be maintained in an orderly manner, free of congested construction debris and trash. All contaminated and uncontaminated wastes shall be handled according to the WM/WC Plan. Disposable contaminated PPE may need to be checked and bagged by the ES&H technician or Office of Radiation Protection representative and handled in the proper manner as directed by the WM Plan. An approved accumulation area will be designated to store these drums for removal by Energy Systems WM.

14.3.2 Consumption of Food and Tobacco Products

Eating, drinking, chewing gum, and use of tobacco products on any potentially contaminated site are confined to designated clean areas only. These areas will be designated by the facility manager. These designated areas shall be surveyed regularly for chemical and/or radioactive contamination.

As a minimum control measure, all personnel who have been in the AOC performing tasks must wash their hands before handling food. Suspected contamination of any of the approved areas will result in discontinuation of their use for food handling or storage.

14.3.3 Emergency Eyewash Units

In areas where eyewash units are required, such as decontamination areas that may employ the use of corrosive chemicals or agents, all eyewash units shall meet or exceed the ANSI standard (ANSI Z358.1). All portable units will be refilled with potable water and shall

be inspected on a weekly schedule. Before refilling the portable unit with potable water, a functional test of the unit is to be performed. A daily visual pressure check shall be performed when work occurs in the area. If the eyewash water has been treated with a manufacturer's chemical preservative, the water should be tested in accordance with the manufacturer's guidelines. The SSHO or ES&H technician must keep a record in the site project logbook of all maintenance and inspection activities for the eyewash units located on site.

14.4 EMERGENCY ACTION PLAN

This section applies to any type of emergency, such as a fire or explosion, radiation, or chemical exposure, personal injury, or other types of emergencies that may be encountered by site personnel during work efforts being conducted at ORNL ER sites.

Emergency contacts' telephone numbers and radio numbers shall be listed at the work site in the staging area and accessible to all site personnel.

14.5 RESPONSIBILITIES OF FIELD PERSONNEL

It is most important that the individual(s) discovering the emergency situation responds immediately and in the proper fashion. The person discovering an emergency or suspected hazard should

1. notify immediately the proper personnel who will coordinate the on-site response,
2. listen to and respond to the emergency as directed by the Site Safety and Health Officer or team leader,
3. know the location and use of on-site emergency equipment,
4. know the location of the on-site and off-site assembly points,
5. know the site emergency signals as well as the laboratory wide alarms and signals,
6. know the identity of the on-site emergency response coordinator, and
7. know the location of the spill control kit.

14.6 EVACUATION ROUTES

Evacuation routes shall be established for all waste staging areas. The location of the route and the recommended progression shall be discussed with all personnel working within the waste staging area. In the event of an evacuation, personnel responsibilities are as follows.

1. Personnel should be familiar with the safest and shortest evacuation route from each site and area in which they work.

2. When an evacuation alarm is sounded, personnel should quickly (and calmly) proceed to the area exit and to the designated assembly point to await further instructions from the shift supervisor.

3. If possible, equipment should be shut down before exit from the area. If undue risk of exposure is present, personnel will not attempt to shut down equipment.

4. Personnel should follow the instructions given over the ORNL public address system, by the supervisor, or by the emergency response team incident commander upon his/her arrival.

5. Personnel should remain at the assembly point until otherwise instructed.

14.7 SPILL CONTAINMENT

A spill control kit shall be available on-site for use in the event of the uncontrolled release of materials considered potentially hazardous to site personnel, the community, or the environment. The spill control kit is considered as a first responder provision to be used by site personnel to control the spread of contamination. The spill kit should be used by personnel only if they are properly protected from exposure to the spill constituents. If spill conditions exceed the control of the spill kit, the ORNL Spill Response Team should be summoned immediately to provide emergency services by contacting the LSS or FCC offices.

The spill containment response kit and other emergency spill materials should contain the following items:

1. LITE-DRI™ liquid absorbent pads and pillows,

2. heavy-duty plastic bags,

3. plastic 55-gal drum liners,

4. spare 55-gal drum(s),

5. nonsparking scoop or shovel (if applicable),

6. bulk absorbent materials such as clay or soda ash,

7. sheet plastic (4-mil thick),

8. warning signs and flagging,

9. duct tape cutter,

10. shoe covers.

11. chemical resistant inner and outer gloves, and

12. Tyvek suits

14.8 CONTAMINATION CONTROL

Waste sites and radiological areas pose a primary concern in controlling the spread of chemical or radiological contamination at the ORR. It is of utmost importance that field personnel, site visitors, equipment, and the surrounding environment be protected from the spread of site contaminants. The strict use of contamination control methods should be employed by site personnel. Whenever engineering controls and safe work practices are not feasible, PPE shall be used to reduce employee exposure levels and maintain the levels as low as reasonably achievable. All engineering controls and safe work practices must be documented in the field log book.

Contamination control methods used on the ORR may include, but are not limited to the following:

1. utilization of barrier protection (plastic sheeting) to safeguard personnel and equipment from contact with contamination,

2. adherence to chemical and/or radiological contamination procedures,

3. use of correct PPE,

4. adherence to sanitation and waste management practices and procedures,

5. enforcement of personal hygiene requirements (hand washing, showering before leaving the ORR or work site if appropriate, etc.); and

6. erecting probed work zones to control and contain the spread of contamination.

15. RECORDS

15.1 REQUIRED RECORDS AND CHANGE CONTROL PROCEDURES

If significant changes are identified that will impact waste volumes, estimates, or TSD facilities in addition to schedule changes, the project manager must revise and reissue the project WM plan and/or checklist for review and approval before project initiation. The same review and approval procedures apply for revision of the plan as applied for the original development and issuance.

The ORNL ER WM manager is responsible for the interpretation of this document.

15.2 WASTE MANAGEMENT LOGBOOK

The WC will maintain a site-specific logbook for all project-specific waste management concerns. The waste generator will maintain documents on waste characterization data. The logbook will contain the following information concerning all waste generated or handled:

1. location of where the waste was generated,
2. disposition and location of waste,
3. date of generation,
4. volume generated,
5. summary of field screening data,
6. summary of CSL screening results (if appropriate),
7. classification of waste (characterization data),
8. weekly generation reports,
9. training records (performance and project based),
10. self-assessments of waste generating activities,
11. assessments of waste storage areas and corrective actions, and
12. log of all paper work filled out in reference to waste management.

15.3 FIELD RECORDS

Subcontractors and prime contractors will retain copies of the forms used for all waste management transactions and will generate and retain an independent record of each waste

material transaction. Copies of analytical data for waste transfer to ESWMO are to be sent to the project manager and ER WM manager. These records will provide the minimum following information:

1. container identification;
2. location at which waste was generated;
3. date at which waste was removed from the project site;
4. date when the waste was transferred to Energy System's custody or disposed of;
5. analytical information that identifies principle isotopes and/or hazardous substances or direct field measurements;
6. total activity or quantity based on laboratory analysis, or estimated total activity based on field measurements or process knowledge;
7. physical form of waste material;
8. destination to which waste material was transferred;
9. name of person or organization receiving the waste; and
10. volume and type of waste generated.

All the above records will be maintained by the prime contractor or subcontractor for the duration of the project. At the completion of the project, ER shall be provided with copies of all these records, with copies sent to the ER Document Management Center.

15.4 SECONDARY AND SUPPORTING RECORDS

Secondary and supporting records provide details concerning the entries in the Waste logbook, including

1. individual logbook contents,
2. CSL screening results report sheets (if appropriate),
3. ES&H survey forms,
4. waste inspection forms
5. copies of applicable Energy Systems and ORNL WM forms, and
6. other forms (as deemed necessary by the WC).

Secondary and supporting records must be referenced in the waste logbook.

15.5 DISPOSITION OF RECORDS

The waste logbook and all secondary supporting records will be submitted to the ER Program Document Management Center for incorporation into the project records.

16. QUALITY ASSURANCE

16.1 SELF-ASSESSMENTS

Self-assessments will be performed to review and evaluate the adequacy of field WM activities and to ascertain whether the WM Plan is being completely and uniformly implemented. Self-assessments shall be performed to verify compliance with all aspects of the programmatic WM Plan and checklist to determine its effectiveness.

The assessments will be conducted in an effective real-time means of evaluating the adequacy and effectiveness of methods for achieving quality and the quality of the final results. Self-assessment results will be documented and reported to and reviewed by responsible management. Follow-up action shall be taken by the responsible line organization when necessary.

The objectives of performing self-assessments are to

1. ensure the WM Plan and/or checklist developed for this project is being implemented according to the specified requirements,

2. assess the effectiveness of the WM Plan, and/or checklist,

3. identify nonconformances/variances, and

4. verify that identified deficiencies are corrected.

Upon the discovery of any significant deviation form the WM plan and/or checklist, the project manager shall be notified of the nature, extent, and corrective action taken to remedy the deviation.

The QA/QC officer may develop an individual self-assessment plan to provide a basis for each assessment. This plan will identify the assessment scope, the activities to be assessed, any applicable documents, and the assessment schedule. Records of self-assessments will be maintained in project files. Self-assessment files will include, at a minimum, the assessment reports, the replies to the assessment findings, and any supporting documents.

16.2 SELF-ASSESSMENT FREQUENCY

The WC and the ER WM coordinator are responsible for performing self-assessments according to a schedule that coincides with appropriate activities on the project schedule. In addition to self-assessments, other types of surveillance of selected activities may be performed on a periodic basis.

16.3 SELF-ASSESSMENT REPORTS

After the completion of a self-assessment, personnel will discuss observed deviations and agree on corrective actions to be initiated. An assessment report will be completed for each assessment activity and become part of the project records.

Minor findings that can be resolved by field personnel during an assessment are not required to be cited as items requiring corrective action. Findings that are not resolved during the course of assessment and findings affecting the overall quality of the project will be noted on the assessment report.

16.4 CORRECTIVE ACTIONS

This section identifies methods and policies for the documentation, evaluation, corrective action, and verification activities necessary when a deviation from established procedures occurs. Requirements for the documentation and implementation of corrective actions also are included.

Any deviation or nonconformance will be evaluated with respect to its possible impact on reportable data. All deviations from specified procedures and methodologies will be evaluated and documented on nonconformance reports (NCRs). Programmatic deficiencies will be documented on Corrective Action Reports.

Deviations or variances from procedures may be necessary, given that procedures fully addressing the entire range of conditions potentially encountered during field activities cannot be prepared. Requirements for issue and implementation of variances from procedures are included.

All nonconformances will be reviewed by the ER Program. This includes all NCRs generated by subcontractors.

16.4.1 Responsibilities of Project Personnel

Project personnel will ensure the prompt identification, control, and disposition of nonconforming items. Each person is responsible for submitting records of all nonconformance events to the project manager immediately following the initial identification and documentation of the nonconformance. The nonconformance then will be evaluated by the QA specialist, project manager, and others deemed relevant. This evaluation will determine the disposition of the nonconformance.

16.4.2 Nonconformance and Corrective Action Procedures

Nonconforming equipment, items, activities, conditions, and unusual incidents that could affect compliance with project requirements will be identified, controlled, reported, and resolved in a timely manner. A nonconformance is defined as a malfunction, failure, deficiency, or deviation from specified requirements. The originator of an NCR will describe the finding on the form provided for this purpose and notify the project management and the QA specialist. When a nonconforming item exists, the person who identifies the item will stop further processing or use of the item, as applicable. Each NCR will be reviewed and a

disposition given for the item, activity, or condition. Copies of the NCRs will be sent to the responsible ER project manager.

Probable cause of the nonconformance will be determined and action to prevent recurrence will be identified. Evaluation will determine if the event justifies the issuing of a Corrective Action Report. The Corrective Action Report will document the event, the findings of the evaluation, and required corrective action. The disposition of a nonconformance will be documented and approved by the QA/QC Officer. Corrective actions taken will be commensurate with the importance, complexity, and safety considerations of the condition or occurrence. The corrective action should resolve the root cause of the problem.

If, in the opinion of project management and the QA specialist, the nonconformance does not significantly affect the technical quality or use of the work, the work many continue, pending resolution of the nonconformance. The basis for such a decision will be documented on the NCR and submitted to the QA specialist for review and approval. The documentation will include the statement that the decision was made before continuing with the work. The records of nonconformances and their dispositions will be forwarded to the records center of the ER Program and the subcontractor.

16.5 READINESS REVIEW

Before mobilizing for the field effort (if applicable), the QA/QC officer and facility manager in an combined effort with the project manager will lead a readiness review, which shall be attended, at a minimum, by the Energy Systems and subcontractor project managers, key field team members, contracts manager, SSHO, and a selected representative for analytical laboratory(s) interface. The readiness review follows a checklist that ensures that all work plans and standard operating procedures are approved and controlled; all assigned personnel are trained and qualified; the site logistics have been handled; proper equipment, materials, and resources are available; the laboratory is ready to accept samples; and that the QA system will be implemented during the field and analytical activities.

The implementing project manager will prepare a list of participants for the readiness review and submit a readiness notification to all affected personnel. The readiness review checklist and any additional required checklists, as specified by the quality assurance project plan, will be completed during the review meeting, and objective documentation supporting evidence of readiness will be attached. The checklist(s) will be reviewed by the QA/QC officer, maintained in the project file, and submitted to the Energy Systems Document Management Center and the subcontractor.

16.6 TRAINING AND QUALIFICATION REQUIREMENTS

All personnel involved in conducting waste management activities on ER sites will be qualified to implement the WM Plan and/or checklist. Qualifications will be demonstrated by education, experience, project-specific training, and performance-based training. The project manager and ER WM coordinator is responsible for verifying and documenting personnel qualifications.

16.7 QA REPORTS TO MANAGEMENT

The active participation of management in a project is fundamental to the success of the WM Plan. Management will be aware of project activities and will participate in development, review, and operation of the project. Management will be informed of the project waste generation activities through the receipt, review, and/or approval of

1. project monthly reports that will include the status of all waste generating activities and be reviewed by the WC,

2. project specific WM plans and/or checklist and procedures,

3. self-assessment,

4. Corrective Action Reports, and

5. NCRs.

Copies of these reports will be distributed to appropriate management. In addition, periodic assessment waste certification activities and data precision, accuracy, representativeness, completeness, and comparability shall be determined and reported by the appropriate personnel.

Project management will inform the QA specialist, as appropriate, of the QA status of the WM activities, especially any significant quality accomplishments or deficiencies. Project personnel are required to inform the QA specialist, project manager, or project support staff of all nonconformances or quality failures.

At the conclusion of the project, the QA specialist will prepare a complete report covering all aspects of project QA for the project manager. This will be incorporated into the final report. Included in this report will be all the NCRs and documented changes to the WM Plan or project-specific checklist.

17. DEVELOPMENT OF THE PROJECT WASTE MANAGEMENT CHECKLIST

The ORNL ER project Specific WM Checklist (Appendix C) was developed to work in conjunction with the ORNL ER Programmatic WM/WC Plan. All projects that will be generating waste are required to complete the ER Project WM checklist, unless a waiver is granted by ER WM program manager.

17.1 PROJECT NAME

This section requires the project name; location of project; estimated project start date; estimated project completion date; and WM checklist number, which will be used for tracking purposes.

17.2 KEY PROJECT PERSONNEL

This section provides a list of key personnel involved in waste generating and management activities associated with the project. For each person, give his/her name, address, and phone number. A project may not involve all the positions listed, so, if they are not a part of the specific project, insert "not applicable." Responsibilities for these personnel are listed in Sect. 4 of the WM Plan. The project manager, ER WM manager or designee, and the ER waste certification official will review and approve the WM checklist and if applicable, the contractor serving as packager. WM and other appropriate organizations (Compliance Division, Health Physics, etc.) may be called upon to review the ER WM checklist. The project manager is responsible for assuring that Waste Management Division is informed of planned activities where waste may require transfer to WMO for TSD.

17.3 INTRODUCTION

Project description: Give a brief description of the scope of the ORNL ER project generating the waste. Include key words, such as D&D, remedial action, or site investigation.

Site history: Provide a brief history of the site (or reference site history documentation).

Reference documents: List reports applicable to this project.

17.4 WASTE GENERATION ACTIVITIES

This section provides a list and location of the generating activities associated with the project.

The first part of this section is a check box form. Mark all appropriate generating activities associated with the project. If there is a generating activity that is not listed, mark the box labeled "other" and give a brief description of the activity. Sections 6 and 7 in the this WM/WC Plan give details on some of the possible generating activities associated with ORNL ER projects.

17.5 WASTE CHARACTERIZATION

The first part of this section is a table for listing the estimated amount of each waste that will be generated. In this table give the type of waste [e g., liquid, metal, soil, sludge, and the waste category, e.g., classified, RCRA, TSCA, LLW (see Sect. 7 of the Programmatic WM plan)], estimate the volume to be generated (see Methodology for Generating Waste Volume Estimates), list the suspected contaminants, and what the characterization was based on.

This section is provided to give more detail as to how waste will be characterized. If there is a need to deviate from the WCP provided in the ER Programmatic WM/WC Plan, describe the changes in detail in this section.

Identify the methods by which the waste will be characterized (e.g., existing data, process knowledge, or laboratory analysis).

17.6 HANDLING AND STORAGE REQUIREMENTS

This section provides the necessary handling and storage requirements for the waste and the volumes that will be generated by this project.

If a waste storage area is to be used, check the appropriate box for the type of storage area required. Be sure to give the name of the Waste Storage Area manager, location, and any special requirements for the type of area to be used. Also be sure to attach any additional information for further clarification.

17.7 WASTE MINIMIZATION

This section provides recommendations that can be taken to minimize the waste that is generated. The minimization techniques listed on the project WM form are just a few of the techniques and technologies available for waste minimization. Section 10 of the programmatic WM/WC Plan gives an overview of several options. Check the box of the best waste minimization options to be implemented for the project and briefly describe any specifics related to the option(s) selected.

If the waste minimization technique is not listed, check the "other" box and describe the technique to be used and its expected affect in the space provided. Also be sure to attach any additional information for further clarification.

17.8 TREATMENT AND DISPOSAL OPTIONS

In this section of the project WM checklist, identify the most appropriate TSD options (if applicable) and identify the organization responsible for determining the treatment or disposal options. Also as part of this section are the specific WM forms that will be required to be completed.

17.9 TRANSPORTATION

List the expected routes of transport. Give the name of the roads and describe the route from the site of generation to the TSD facility and indicate if the route will follow public roads.

REFERENCES

Clark, C., Jr., S. N. Burman, D. J. Cipriano, Jr., M. S. Uziel, K. R. Kleinhans, and P. F. Tiner. 1994. *Health and Safety Plan for Environmental Restoration Program at Oak Ridge National Laboratory*, ORNL/ER-226, Oak Ridge National Laboratory, Oak Ridge, Tenn.

Energy Systems (Martin Marietta Energy Systems, Inc.) May 1994. Environmental Restoration Waste Management Programs Intersite Procedure Manual, "*Management of Waste Generated from Field Investigation and Sampling Activities*", ERWM/ER-P2103, Rev.0, Oak Ridge, Tenn.

EPA (U.S. Environmental Protection Agency) January 1992, *Guide to Management of Investigation-Derived Wastes*, Office of Solid Waste and Emergency Response Directive No. 9345.3-03 FS, Washington, D.C.

ORNL (Oak Ridge National Laboratory) October 1992. *On-Site Transportation Manual*, ORNL/M-808, Oak Ridge, Tenn.

ORNL (Oak Ridge National Laboratory) July 1994a."Oak Ridge Reservation Waste Certification Requirements Procedure," EP-710, Oak Ridge, Tenn.

ORNL (Oak Ridge National Laboratory) July 1994b. "Waste Acceptance Criteria for the Oak Ridge Reservation," ES-WM-10, July 1994. Oak Ridge, Tenn.

ORNL (Oak Ridge National Laboratory) July 1994c."Waste Certification Program Plan for the Oak Ridge Reservation," ES-WM-6, July 1994. Oak Ridge, Tenn.

ORNL Environmental Compliance and Health Protection Division. March 1988. ORNL Health, Safety and Environmental Protection Procedure for Excavation Operations, M116/R1, Oak Ridge, Tenn.

ORNL Environmental Compliance and Health Protection Division. May 1993. *Health, Safety, and Environmental Protection Procedure for Excavation Operations*, Interim Revision of Document M-116, Oak Ridge, Tenn.

ORNL WMRAD, Environmental Programs Coordination Section, and Waste Minimization, Planning and Certification Section. June 1994. *Waste Acceptance Criteria for Radioactive Solid Waste Disposal at SWSA-6, WMRA-WMPC-413*, Oak Ridge, Tenn.

"Waste Acceptance Criteria for Liquid Waste Treatment Systems, WM-WMCO-201," July 1991.

Appendix A

ORNL ER Program Project Specific Waste Management Checklist

ORNL ER Program Project Specific Waste Management Checklist

Project Name _____

ER Waste Management Checklist # _____

ORNL Waste Management Organization # (if applicable) _____

The ER WM checklist number will be assigned by the Oak Ridge National Laboratory Environment Restoration Document Management Center Manager

ORNL/ER PROJECT
WASTE MANAGEMENT CHECKLIST
APPROVAL FORM

_____
ER WM CHECKLIST

_____
ORNL WMO # (if applicable)

ER Project Manager	Date
ER Waste Management Manager	Date
ER Waste Management Certification Official	Date
ORNL Waste Management Organization	Date

ORNL/ER PROJECT
WASTE MANAGEMENT CHECKLIST

Project Name: _____ ORNL WMO #: _____
Location: _____ ER WM Checklist #: _____
Est. Start Date: _____ Date Form Complete: _____
Charge # for WM: _____

1.0 KEY PROJECT PERSONNEL

ER Project Manager: _____ ER WC: _____
Address: _____ Address: _____
Phone: _____ Phone: _____

Facility Manager: _____ Waste Generator: _____
Address: _____ Address: _____
Phone: _____ Phone: _____

Packager: _____ SSHO:(if applicable): _____
Address: _____ Address: _____
Phone: _____ Phone: _____

ER WM Coordinator: _____ Construction Engineer: _____
(if applicable)
Address: _____ Address: _____
Phone: _____ Phone: _____

2.0 INTRODUCTION

2.1 Project Description:

_____
_____
_____
_____
_____
_____
_____
_____

2.2 Brief Site History:

_____
_____
_____
_____
_____
_____
_____
_____

ORNL/ER PROJECT SPECIFIC
WASTE MANAGEMENT CHECKLIST

2.3 Reference Documents

_____
_____
_____

3.0 Waste Generation Activities (see Section 6 of PWM/WC Plan)

☐ Coring	☐ PPE	☐ Geophysical Survey	☐ Remedial Actions
☐ Drilling	☐ Excavating	☐ D&D Activities	☐ UST Activity
☐ Deconning	☐ Renovations	☐ Well Installation/Maint.	☐ ISV
☐ Water Sampling	☐ Soil Sampling	☐ Scoping Surveys	☐ Other_____

Explain Other

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

3.2 Waste Generating Area(s)

☐ WAG 1	☐ WAG 4	☐ WAG 7	☐ WAG 10	☐ WAG 21
☐ WAG 2	☐ WAG 5	☐ WAG 8	☐ WAG 11	☐ Other(s)
☐ WAG 3	☐ WAG 6	☐ WAG 9	☐ WAG 13	

Location or Building Number(s)

_____
_____
_____
_____

ORNL/ER PROJECT SPECIFIC
WASTE MANAGEMENT CHECKLIST

4.0 Waste Characterization

4.1 Wastes Types and Volume

Type[1]	Category[2]	Solids[3] (ft^3)	Liquids (gallons)	Waste stream/source	Suspected contaminants (radiological and chemical)[4]	Contaminant determined by sampling and analysis	Contaminant determined by process knowledge[5]

1 Liquid, metal, plastic, soil, sludge, solid, gas (compressed), etc.

2 Classified, clean, construction, hazardous, mercury, mixed, nonhazardous, radiological, TRU, TSCA, etc.

3 See Methodology for Generating Waste Volumes Estimates (ORNL/ER-148). It is imperative that waste volumes be given the appropriate units. (i.e., solids in cubic feet, liquids in gallons, etc.)

4 This is not to include trace or naturally occurring chemicals or radionuclides found in nature.

5 See Sect. 2 of the Project Specific Checklist for a list of reference documents. Documents that defend process knowledge should be listed in Sect. 2.

What Methodology was used to estimate waste volumes?

_____

_____

_____

4.2 Waste Characterization Plan

_____

_____

_____

_____

_____

_____

Has the organization or person responsible for obtaining samples been designated?
Yes / No / NA
List name _____

Has the organization responsible for analyzing samples been identified?
Yes / No / NA
List name _____

Can the ORNL Hazardous Waste Group take control of the hazardous or mixed waste generated?
Yes / No / NA
Person Contacted_____ **Date**_____

Can the Solid Radioactive Waste Group accept the volume of radiological waste to be generated?
Yes / No / NA
Person Contacted_____ **Date**_____

Can the Liquid Gaseous Waste Group accept the liquid that will be generated?
Yes / No / NA
Person Contacted_____ **Date**_____

If any TRU or TRU Mixed Waste is to be generated contact the Waste Certification Official before project starts.
Person Contacted_____ **Date**_____

Will TRU or mixed waste be generated?
Yes/No/NA

Will waste be handled as Investigative Derived Waste?
Yes / No / NA

List any specific requirements as requested by any of the above organizations or compliance.

_____

_____

_____

Who will be responsible for completing the weekly ER Waste Management Program Generated Waste form?

Name: _____ **Phone:** _____

5.0 HANDLING AND STORAGE REQUIREMENTS

5.1 List Special Handling Procedures For Waste or Waste Containers (refer to specific sections of the WM/CP plan)

_____

_____

5.2 List What Will Be Used To Protect The Integrity Of Waste Containers From Environmental Elements. (Examples: Lid Tops, Plastic Covering, Epoxy, Storage Shelter)

_____

_____

5.3 Applicable Waste Storage Area(s)

☐ Waste Staging Area ☐ Satellite Accumulation Area ☐ Waste Consolidation Area
☐ 90-d Storage Facility ☐ AOC ☐ Other_____

5.4 Explain how waste will be managed to assure that personal safety and the environment will be protected (refer to specific sections of WM/CP plan).

_____
_____
_____
_____

Name of Waste Storage Area Supervisor: _____

Does supervisor and staff have the appropriate training required? Yes/No/NA

List training requirements:

_____
_____
_____

Will a spill control kit be required on-site? Yes/No/NA

List items:

_____
_____

6.0 WASTE MINIMIZATION

6.1 Waste Minimization Techniques To Be Implemented (refer to programmatic WM plan Section 10 for guidance)

☐ Segregation	☐ Area of Contamination Concept
☐ Decontamination	☐ Material Recycle (Solvents, Decon Waters)
☐ Compaction	☐ Cutting Fluids Recovery
☐ Solvent Substitution	☐ Selection of Equipment
☐ Sludge Dewatering	☐ Solidation
☐ Selection PPE	☐ Other

Explain specific techniques not listed above

_____
_____
_____
_____
_____
_____
_____
_____
_____

7.0 TREATMENT, STORAGE, AND DISPOSAL OPTIONS

7.1 Potential Treatment, Storage or Disposal Options (If Applicable)

Option	Waste Capacity	Responsible Organization
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

7.2 Special Requirements of the WAC To Meet

_____
_____
_____
_____

7.3 Applicable Waste Management Forms:*

☐ UCN-2822	☐ UCN-11457	☐ UCN-2109	☐ TX-5352A
☐ UCN-16114	☐ UCN-20116	☐ UCN-20117	☐ Other
☐ UCN-16114A	☐ UCN-19611	☐ UCN-20118	

*List Persons(s) that will be responsible for completing and signing Waste Management form(s):

_____
_____
_____
_____

8.0 TRANSPORTATION

8.1 Transportation Requirements

A. Who or what organization will transport waste to waste consolidation or staging area?

_____

B. List specific issues for transporting waste and their resolutions.

_____
_____
_____

Appendix B
Applicable Waste Management Forms

Because of regulatory and Oak Ridge Reservation requirements, waste management forms are in continuous change. Generators are responsible for ensuring that the most recent version of each waste management form is being used.

The forms inside this appendix are not to be considered all inclusive nor should they be considered as the most recent version. Contact the Waste Certification Official or the Waste Management Organization for update information in reference to waste management forms and other specific requirements.

ENVIRONMENTAL RESTORATION WASTE MANAGEMENT PROGRAM
TOTAL GENERATED WASTE

CONTAINER ID NOS.

CONTAINER TYPE | WASTE GENERATION DATE (mm/dd/yy)

☐ K-25 ☐ ORNL ☐ Y-12 ☐ PADUCAH ☐ PORTSMOUTH ☐ OFF-SITE

ACTIVITY

RA: ☐ PA/SI ☐ RI/FS-I ☐ RI/FS-II ☐ RD/RA | **D&D:** ☐ PHASE I ☐ PHASE II ☐ PHASE III ☐ SURVEILLANCE & MAINTENANCE

POJECT NUMBER | PROJECT NAME

VOLUME AND WEIGHT

SOLID: _____ cu. ft. | WEIGHT: _____ lbs. | LIQUID: _____ gal. | WEIGHT: _____ lbs.

WASTE MATERIAL TYPE (Choose only one)

SOLID: ☐ SOIL	e.g., excavated soil	**LIQUID:** ☐ DECON SOLUTION	e.g., decontamination and cleaning liquids
☐ DEBRIS	e.g., wood, roofing material, construction spoil, concrete, glass	☐ WELL DEVELOP/PURGE	e.g., well sampling liquids
☐ SLUDGE	e.g., settling basin, tank, pipeline, equipment cleaning	☐ GROUND/ SURFACE WATER	e.g., contaminated ground-water, seeps, rainwater run-off
☐ SEDIMENT	e.g., contaminated environmental media from streams/lakes	☐ SOLVENTS/OILS	e.g., cleaning fluids, lube oils, degreasers, diesel fuel
☐ PPE/TRASH	e.g., paper, shoe scuffs, Tyvek suits, respirators, wipes	☐ OTHER AQUEOUS	e.g., acids, process solutions
☐ ASBESTOS	e.g., Transite, insulation	☐ CLASSIFIED LIQUIDS	_____
☐ METAL	e.g., shielding, ductwork, structural, drums	☐ MISC. OTHER SPECIFY	_____
☐ METAL EQUIPMENT	e.g., transformers, capacitors		
☐ CLASSIFIED SOLIDS	_____		
☐ MISC. OTHER SPECIFY	_____		

WASTE CATEGORIES

☐ LLW	☐ TRU	☐ LLW/TSCA	☐ TRU/RCRA	☐ FREE - Hg
☐ RCRA	☐ SANITARY	☐ LLW/RCRA/TSCA	☐ TRU/TSCA	☐ SPECIAL NUCLEAR MATERIAL
☐ TSCA	☐ LLW/RCRA	☐ RCRA/TSCA	☐ TRU/LLW	

CHEMICAL CONTAMINANTS (all known)

1. CONTAMINANT	CONCENTRATION/UNITS	☐ Process Knowledge ☐ Lab Analysis	Document No. Document No.
2 CONTAMINANT	CONCENTRATION/UNITS	☐ Process Knowledge ☐ Lab Analysis	Document No. Document No.
3 CONTAMINANT	CONCENTRATION/UNITS	☐ Process Knowledge ☐ Lab Analysis	Document No. Document No.
4 CONTAMINANT	CONCENTRATION/UNITS	☐ Process Knowledge ☐ Lab Analysis	Document No. Document No.
5 CONTAMINANT	CONCENTRATION/UNITS	☐ Process Knowledge ☐ Lab Analysis	Document No. Document No.

FORM COMPLETED BY (Name) | BADGE NUMBER | DATE (mm/dd/yy)

MARTIN MARIETTA

WASTE ITEM DESCRIPTION

WASTE ITEM IDENTIFICATION

I1. Waste Item ID Number	I2. Generator's Name (Print)	I3. Badge No.	I4. Generator's Phone No.	I5. MS	I6. Charge Number/WO

I7. Origin Div.	I8. Origin Date	I9. Origin Site	I10. Origin Facility	I11. Origin Room/Area	I12. Radiological Area? ☐ Yes ☐ No

I13. Est. Net Volume	I14. Units	I15. Est. Gross Weight	I16. Units	(Reserved)

CONTAINER INFORMATION (1 of) If more than one attach Waste Container List (UCN-2109A)

C1. Container ID. No.	C2. Container Type	C3. Holding Site	C4. Holding Facility	C5. Holding Room/Area

WASTE CATEGORY

W1. Process Stream ID	W2. Process Category	W3. Process Activity

W4. Physical Form	W5. Material Type	W6. AWA No.

W7. Waste Description

W8. Waste Category (Check all)

	Yes	No		Yes	No
Chemical			Biological		
Radioactive			Accountable		
Asbestos			Carcinogen		
San/Ind			Compactible		
Const. Debris			Recyclable		
Medical			Classified		

CHEMICAL WASTE

M1. RCRA? ☐ Yes ☐ No	M2. RCRA 90-day Start Date	M3. PCB? ☐ Yes ☐ No	M4. PCB Start Date	M5. PCB Conc. (PPM)

M6. Determination Method (Check ONE) ☐ Analysis ☐ Process Knowledge ☐ Reference	M7. Determination Document Number(s)	M8. Flash Pt.	M9. pH

M10. EPA Waste Code Numbers

M11. Substance ID	M12. Vol %	M13. Substance Name

RADIOACTIVE WASTE

R1. RAD Category (Check ONE) ☐ TRU ☐ High-Level ☐ Low-Level ☐ Special ☐ VLA	R2. RAD Handling Type ☐ Contact ☐ Remote	R3. UCN 2081 No.

R4. Determination Method (Check ONE) ☐ Analysis ☐ Process Knowledge ☐ Reference	R5. Determination Document Number(s)	
	R6. Chemical Form	(Reserved)

R7. Isotope	R8. Est. Qty	R9. Units	R7. Isotope	R8. Est. Qty	R9. Units	R7. Isotope	R8. Est. Qty	R9. Units

HANDLING INFORMATION

H1. Handling Instructions

H2. Respirator ☐ None ☐ Half ☐ Full

H3. Cartridge Type

H4. HP Tag Color	Surface Contamination (dpm/100 cm²) Transfer	Direct Read	Dose Rate at Surface (mrem/hr)	Dose Rate at 1 Meter (mrem/hr)	Instrument
Alpha					
Beta/Gamma					
Neutron					

H5. Pickup Site	H6. Pickup Facility	H7. Pickup Area

SIGNATURES and APPROVALS

S1. Generator	Badge	Date	S2. HP Technician	Badge	Date
S3. Verification Officer	Badge	Date	S4. Derivative Classifier	Badge	Date

MARTIN MARIETTA

LOW-LEVEL WASTE ATTACHMENT A

Referenced from WID (UCN-2109)	
Waste Item ID Number	C1. Container ID. No.

ALL YES/NO RESPONSES ARE REQUIRED

Prohibited Items	Yes	No		Yes	No
1A. Pyrophoric Materials			6A. Ignition Sources		
2A. Active Chelating Agents (> 1% of waste)			7A. Free Liquids		
3A. TRU Radioisotopes (> 100 nCi/gm)			8A. RCRA Waste		
4A. Explosive Materials			9A. TSCA Waste		
5A. Etiological Agents			(Reserved)		

ES/WM-10 Subcategory	Yes	No		Yes	No
10A. Sealed Sources			14A. Biological		
11A. Smeltable Metals			15A. Incinerable		
12A. Compactible			16A. Sludge		
13A. Non-Compactible			17A. Fissionable		

18A. Chelating Agents ☐ Yes ☐ No	19A. Beryllium ☐ grams ☐ ppm
20A. Ion Exchange Resins ☐ Yes ☐ No	(Reserved)
21A. Absorbent Materials grams	

☐ 1R. Radioisotope Continuation Sheet(s) _____ through _____ attached.

Radioisotope Determination Method		
☐ 2R. Analysis LSID #(s)		☐ 3R. Process Knowledge UCN 20116#
8R. Fissile Content (FGE of U-235)	9R. Enrichment (% of U-235)	10R. Chemical Form

4R. Radioisotope	5R. Quantity	6R. Units Ci	G	pCi/L	7R. NARM Yes	No	4R. Radioisotope	5R. Quantity	6R. Units Ci	G	pCi/L	7R. NARM Yes	No

I certify that I have been provided sufficient information concerning the above described waste to apply the requirements of ES/WM-10, Waste Acceptance Criteria for the Oak Ridge Reservation, and, based on this information, I further certify that this waste material:

1) Is accurately described above and packaged in accordance with Waste Certification Procedure _____ Rev Date _____ , and

2) Meet the Waste Acceptance Criteria for the LOW-LEVEL WASTE Category, as listed in ES/WM-10.

3) Or, if applicable, meets the conditions stipulated in variance number _____

I further certify that all required documentation is attached to the UCN 2109 and that, to the best of my knowledge and belief, the information on the UCN 2109 is complete and accurate. I am currently authorized to perform Waste Certifier functions.

Signature Waste Certifier	Printed Name	Badge Number	Date

S4. Derivative Classifier	Badge	Date

UCN-2109D (3-95)

Energy Systems Waste Disposal Request (UCN-2109D) Instructions
Attachment A Low Level Waste

All items must be completed. N/A items that are "not applicable" unless instructions indicate otherwise.

REFERENCE FROM WID (UCN-2109)

I1. Waste Item ID Number: The unique ID number of the waste item

C1. Container ID Number: The unique ID number of the shipping/storage container for the waste

PROHIBITED ITEMS

Is the following present in the waste (all items must be marked Yes or No)

1A. Pyrophoric Materials

2A. Active Chelating Agents (>1% of the weight of the waste)

3A. Transuranic Radioisotopes greater than 100 nCi/g.

4A. Explosive Materials

5A. Etiological Agents

6A. Ignition Sources

7A. Free Liquids (Only applies to Solid Low Level Waste)

8A. RCRA Wastes

9A. TSCA Wastes

ES/WM-10 SUBCATEGORY

Does the waste fall into any of the subcategories (All items must be marked for each subcategory):

10A. Sealed Sources: Defined as a special form radioactive material in regulations promulgated by the Nuclear Regulatory commission in Title 10 Code of Federal Regulations Part 71.4. More information is found in ES/WM-10.

11A. Smeltable Metals: Solids containing only metal of the following types: Stainless steel, carbon steel, iron, and galvanized metal.

12A. Compactible: Solids consisting of glass and all small metal articles not composed of the metals listed in the smeltable metals category

13A. Non-Compactible: Solids consisting of soil, concrete, and demolition waste.

14A. Biological: Solids of a biological nature (shrubs, trees, animal carcasses, animal bedding, etc.).

15A. Incinerable: Solids that contains only combustible materials (paper, plastic, cloth, rubber, and wood). Polyvinyl chloride is prohibited.

16A. Sludge: The sludge must not contain free liquids.

17A. Fissionable: Solids that contain the isotopes ^{233}U, ^{235}U, ^{238}Pu, ^{239}Pu, ^{241}Pu or the elements neptunium, americium, curium, berkelium, and californium and the quantity exceeds 1g of ^{235}U equivalent or the quantity is greater than 1 g/ft^3 of ^{235}U.

18A. Chelating Agents: Does the waste contain chelating agents? (Check Yes or No)

19A. Beryllium: Report the quantity of beryllium (check ppm or grams)

20A. Ion Exchange Resins: Does the waste contain ion exchange resins? (Check Yes or No)

21A. Absorbent Materials: Report the grams of absorbent materials present in the waste.

RADIOISOTOPES

1R. Radioisotopes Continuation Sheet(s): Check this box if continuation sheets are attached and include the page numbers

RADIOISOTOPE DETERMINATION METHOD

2R. Analysis LSID #(s): Report the Lab Sample ID (LSID) for any radioisotope analyses and attach the results of the analyses.

3R. Process Knowledge UCN 20116#: Identify the form ID, if process knowledge was used for radioisotope characterization.

4R. Radioisotope: Identify the radioisotopes that comprise greater than or equal to 1% of the total activity in the waste package. ^{14}C, ^{36}Cl, ^{230}Th, ^{232}Th, ^{99}Tc, and all isotopes with atomic number >92 must be identified if present in any quantity.

5R. Quantity: Report the quantity of each radioisotope identified in 4R.

6R. Units: Check Ci (curies) or G (grams).

7R. NARM: Is the isotope identified in 4R a Naturally-occurring and Accelerator-produced Radioactive Material? Check Yes or No.

8R. Fissile Content (FGE of U-235): Report the fissile gram-equivalent (FGE) of ^{235}U present.

9R. Enrichment (% of U-235): Report the percent enrichment of the uranium ^{235}U present.

10R. Chemical Form: The chemical form of the waste material.

CERTIFICATION INFORMATION

Provide the Waste Certification Procedure number and the revision date used to certify the Waste Acceptance Criteria have been meet. If a variance has been approved provide the unique variance number. The signature of the Waste Certifier , printed name, badge number and date.

S4. Derivative Classifier: Determines the waste item security classification and reviews the form with the UCN 2109 for classified information

MARTIN MARIETTA

TRU/TRU MIXED WASTE ATTACHMENT B

Referenced from WID (UCN-2109)	
Waste Item ID Number	C1. Container ID. No.

ALL YES/NO RESPONSES ARE REQUIRED

Prohibited Items	Yes	No		Yes	No
1B. Pyrophoric Materials			6B. Ignition Sources		
2B. Active Chelating Agents (> 1% of waste)			7B. Free Liquids		
3B. Sealed internal containers > 1 gallon			8B. Etiological		
4B. Explosive Materials			(Reserved)		
5B. Small Particulates (</= 1% by wt < 10um; </= 15% by wt < 200um)					

9B. Biological Waste	10B. Chelating Agents	11B. Heat Sealed Bags	12B. Ion Exchange Resins	13B. TRUCON Code	14B. Thermal Power
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No		W/ft3

15B. Combustible Material	16B. Beryllium	17B. TRU Waste Type(s)	18B. Number of Sealed Layers
%	☐ ppm ☐ grams		

19B. Sealed Layers Type

☐ 1R. Radioisotope Continuation Sheet(s) _____ through _____ attached.

Radioisotope Determination Method			4R. Radioisotope	5R. Quantity	6R. Units			7R. NARM	
☐ 2R. Analysis LSID #(s)		☐ 3R. Process Knowledge UCN 20116#			Ci	G	pci/L	Yes	No
8R. Fissile Content (FGE of U-235)	9R. Enrichment (% of U-235)								
10R. Chemical Form									

☐ 1M. Constituent Continuation Sheet(s) _____ through _____ attached.

RCRA/TSCA Determination Method			Determination	Yes	No
☐ 2M. Analysis LSID #(s)		☐ 3M. Process Knowledge UCN 20116#	4M. RCRA Waste		
			5M. TSCA Waste		
			(Reserved)		

6M. PCB	7M. PCB Concentration	8M. PCB Source Conc.	9M. PCB Source Concentration Range (ppm)
☐ Yes ☐ No	ppm	ppm	☐ 2 - 49.99 ☐ 50 - 499.99 ☐ >/= 500

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

I certify that I have been provided sufficient information concerning the above described waste to apply the requirements of ES/WM-10, Waste Acceptance Criteria for the Oak Ridge Reservation, and, based on this information, I further certify that this waste material:

1) Is accurately described above and packaged in accordance with Waste Certification Procedure _____ Rev Date _____, and

2) Meet the Waste Acceptance Criteria for the TRU/TRU MIXED WASTE Category, as listed in ES/WM-10.

3) Or, if applicable, meets the conditions stipulated in variance number _____

I further certify that all required documentation is attached to the UCN 2109 and that, to the best of my knowledge and belief, the information on the UCN 2109 is complete and accurate. I am currently authorized to perform Waste Certifier functions.

Signature Waste Certifier	Printed Name	Badge Number	Date

S4. Derivative Classifier	Badge	Date

Energy Systems Waste Disposal Request (UCN-2109E) Instructions
Attachment B TRU and TRU Mixed

All items must be completed. N/A items that are "not applicable" unless instructions indicate otherwise.

REFERENCE FROM WID (UCN-2109)

I1. Waste Item ID Number: The unique ID number of the waste item

C1. Container ID Number: The unique ID number of the shipping/storage container for the waste.

PROHIBITED ITEMS

Is the following present in the waste (all items must be marked Yes or No).

1B. Pyrophoric Materials
2B. Active Chelating Agents (>1% of the weight of the waste)
3B. Sealed Internal Containers >1 gallon
4B. Explosive Materials
5B. Small Particulates (≤1% by weight for particulates <10um and ≤15% by weight for particulates <200um)
6B. Ignition sources
7B. Free Liquids
8B. Etiological Agents

WASTE INFORMATION

9B. Biological Waste: Does the waste contain biological waste (Check Yes or No).
10B. Chelating Agents: Does the waste contain any chelating agents? (Check Yes or No)
11B. Heat Sealed Bags: Does the waste contain any bags that have been heat sealed? (Check Yes or No)
12B. Ion Exchange Resins: Does the waste contain ion exchange resins? (Check Yes or No)
13B. TRUCON Code: Identify the TRUCON Code for the waste (Indicate either OR125A or OR125B).
14B. Thermal Power: Report the thermal power for waste generating >1 WR3 of power.
15B. Combustible Material: Estimate the percent, to the nearest 25%, by weight of combustible material in the waste.
16B. Beryllium: Report the quantity of beryllium (check ppm or grams)
17B. No. of Sealed Layers: Report the number of sealed layers of packaging.
18B. Sealed Layers Type: Identify the type of sealed layers of packing starting with the innermost layer and working outward.
19B. TRU Waste Type(s): Enter the code(s) from the following list that describe the waste matrix: (W=Waste) FW-Filter WW-Wood GW-Glass CW-Combustible CSW-Combined Solidified OSW-Organic Solid ISW-Inorganic Solid MW-Metal SOS-Solidified Organic Solids LR-Leaded Rubber HIS-Homogenous Inorganic Solids SIS-Solidified Inorganic Solids IXR-Ion Exchange Resins

RADIOISOTOPES

1R. Radioisotopes Continuation Sheet(s): Check this box if continuation sheets are attached and include the page numbers.

RADIOISOTOPE DETERMINATION METHOD

2R. Analysis LSID #(s): Report the Lab Sample Id (LSID) for any radioisotope analyses and attach the results of the analyses.
3R. Process Knowledge UCN 20116#: Identify the form ID, if process knowledge was used for radioisotope characterization.
4R. Radioisotope: Identify the radioisotopes that comprise greater than or equal to 1% of the total activity in the waste package. 14C, 36Cl, 230Th, 232Th, 99Tc, and all isotopes with atomic number >92 must be identified if present in any quantity.
5R. Quantity: Report the quantity of each radioisotope identified in 4R.
6R. Units: Check Ci (curies) or G (grams).
7R. NARM: Is the isotope identified in 4R a Naturally-occurring and accelerator-produced radioactive material? Check Yes or No.
8R. Fissile Content (FGE of U-235): Report the fissile gram-equivalent (FGE) of 235U present.
9R. Enrichment (% of U-235): Report the percent enrichment of the uranium 235U present.
10R. Chemical Form: The chemical form of the waste material.

CONSTITUENTS

1M. Constituent Continuation Sheet(s)- Check this box if continuation sheets are attached and include the page numbers.

RCRA/TSCA DETERMINATION METHOD

2M. Analysis LSID #(s): Report the Lab Sample Id (LSID) for any RCRA/TSCA analyses and attache the results of the analysis.
3M. Process Knowledge UCN 20116#: Identify the from ID, if process knowledge was used for RCRA/TSCA characterization.
4M. RCRA Waste: Does the waste contain any RCRA regulated materials? Check Yes or No.
5M. TSCA Waste: Does the waste contain any TSCA regulated materials? Check Yes or No.
6M. PCB: Does the waste contain any PCBs? Check Yes or No.
7M. PCB Concentration: Report the concentration in parts per million (ppm) of PCB's in the waste.
8M. PCB Source Conc.: Report the PCB source concentration where the waste originated, if known.
9M. PCB Source Conc. Range: Check the appropriate PCB source concentration range where the waste originated .
10M. Chemical Form: The chemical form of the waste material.
11M. Substance ID: Give the Chemical Abstract Registry (CAS) number or MSDS record number of the chemical constituents.
12M. Conc: Report the concentration for the substance ID.
13M. Units: Identify the concentration units of meesure.
14M. EPA Code: Give the EPA hazardous waste code number determined from the waste characteristics.
15M. Substance Name: The common name of the chemical substance.

CERTIFICATION INFORMATION

Provide the Waste Certification Procedure number and the revision date used to certify the Waste Acceptance Criteria have been meet. If a variance has been approved provide the unique variance number The signature of the Waste Certifier , printed name, badge number and date.

S4. Derivative Classifier: Determines the waste item security classification and reviews the form with the UCN 2109 for classified information

MARTIN MARIETTA

RCRA AND/OR TSCA WASTE   ATTACHMENT C

Referenced from WID (UCN-2109)	
Waste Item ID Number	C1. Container ID. No.

Prohibited Items	Yes	No
1C. Chemically Incompatible Substances		
2C. Radioisotopes		

ALL YES/NO RESPONSES ARE REQUIRED

3C. Flashpoint ☐ deg/Celsius ☐ deg/Fahrenheit	4C. Boiling Point ☐ deg/Celsius ☐ deg/Fahrenheit	5C. Corrosivity to Steel mm/yr	6C. Beryllium ☐ ppm ☐ grams	7C. pH

☐ 1M. Constituent Continuation Sheet(s) ______ through ______ attached.

RCRA/TSCA Determination Method			Determination	Yes	No
☐ 2M. Analysis LSID #(s)		☐ 3M. Process Knowledge UCN 20116#	4M. RCRA Waste		
			5M. TSCA Waste		
			(Reserved)		

6M. PCB ☐ Yes ☐ No	7M. PCB Concentration ppm	8M. PCB Source Conc. ppm	9M. PCB Source Concentration Range (ppm) ☐ 2 - 49.99 ☐ 50 - 499.99 ☐ >/= 500

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

I certify that I have been provided sufficient information concerning the above described waste to apply the requirements of ES/WM-10, Waste Acceptance Criteria for the Oak Ridge Reservation, and, based on this information, I further certify that this waste material:

1) Is accurately described above and packaged in accordance with Waste Certification Procedure ______________________ Rev Date ______________, and

2) Meet the Waste Acceptance Criteria for the RCRA AND/OR TSCA WASTE Category, as listed in ES/WM-10.

3) Or, if applicable, meets the conditions stipulated in variance number ______________________

I further certify that all required documentation is attached to the UCN 2109 and that, to the best of my knowledge and belief, the information on the UCN 2109 is complete and accurate. I am currently authorized to perform Waste Certifier functions.

Signature Waste Certifier	Printed Name	Badge Number	Date

S4. Derivative Classifier	Badge	Date

UCN-2109? (2-95)

Energy Systems Waste Disposal Request (UCN-2109F) Instructions
Attachment C RCRA and/or TSCA Waste

All items must be completed. N/A items that are "not applicable" unless instructions indicate otherwise.

REFERENCE FROM WID (UCN-2109)

I1. Waste Item ID Number: The unique ID number of the waste item

C1. Container ID Number: The unique ID number of the shipping/storage container for the waste

PROHIBITED ITEMS

Is the following present in the waste (all items must be marked Yes or No).

1C. Chemically Incompatible Substances: Example acids and bases

2C. Radioisotopes: To have no radioisotopes present, must meet the requirements of the site's No Rad Added Program.

WASTE DESCRIPTION

3C. Flashpoint: Report the flashpoint of the waste and check the appropriate units of measure (Celsius or Fahrenheit).

4C Boiling Point: Report the boiling point of the waste if the flashpoint (3C) is below 140°F. (Check Celsius or Fahrenheit).

5C. Corrosivity to Steel: Report the corrosivity to steel by the method described in 40 CFR 261.22 for nonaqueous liquid wastes.

6C. Beryllium: Report the quantity and units of measure (ppm or grams) for waste containing Beryllium.

7C. pH: Report the pH value for aqueous wastes.

CONSTITUENTS

1M. Constituent Continuation Sheet(s)- Check this box if continuation sheets are attached and include the page numbers.

RCRA/TSCA DETERMINATION METHOD

2M. Analysis LSID #(s): Report the Lab Sample Id (LSID) for any RCRA/TSCA analyses and attach the results of the analysis.

3M. Process Knowledge UCN 20116#: Identify the from ID, if process knowledge was used for RCRA/TSCA characterization.

4M. RCRA Waste: Does the waste contain any RCRA regulated materials? Check Yes or No.

5M. TSCA Waste: Does the waste contain any TSCA regulated materials? Check Yes or No.

6M. PCB: Does the waste contain any PCBs? Check Yes or No.

7M. PCB Concentration: Report the concentration in parts per million (ppm) of PCB's in the waste.

8M. PCB Source Conc.: Report the PCB source concentration where the waste originated, if known.

9M. PCB Source Conc. Range: Check the appropriate PCB source concentration range where the waste originated.

11M. Substance ID: Give the Chemical Abstract Service (CAS) registry number or MSDS record number of the chemical constituents.

12M. Conc: Report the concentration for the substance ID.

13M. Units: Identify the concentration units of measure.

14M. EPA Code: Give the EPA hazardous waste code number determined from the waste characteristics.

15M. Substance Name: The common name of the chemical substance.

CERTIFICATION INFORMATION

Provide the Waste Certification Procedure number and the revision date used to certify the Waste Acceptance Criteria have been meet. If a variance has been approved provide the unique variance number. The signature of the Waste Certifier, printed name, badge number and date.

54. Derivative Classifier: Determines the waste item security classification and reviews the form with the UCN 2109 for classified information.

MARTIN MARIETTA

RCRA MIXED AND/OR TSCA RADIOACTIVE WASTE

ATTACHMENT D

Referenced from WID (UCN-2109)	
Waste Item ID Number	C1. Container ID. No.

Prohibited Items	Yes	No
1D. Chemically Incompatible Substances		

ALL YES/NO RESPONSES ARE REQUIRED

2D. Chelating Agents ☐ Yes ☐ No	3D. Ion Exchange Resins ☐ Yes ☐ No	4D. pH	5D. Beryllium ☐ ppm ☐ grams
6D. Corrosivity to Steel mm/yr	7D. Flashpoint ☐ deg/Celsius ☐ deg/Fahrenheit	8D. Boiling Point ☐ deg/Celsius ☐ deg/Fahrenheit	

☐ 1R. Radioisotope Continuation Sheet(s) _____ through _____ attached.

Radioisotope Determination Method			4R. Radioisotope	5R. Quantity	6R. Units Ci	G	pci/L	7R. NARM Yes	No
☐ 2R. Analysis LSID #(s)		☐ 3R. Process Knowledge UCN 20116#							
8R. Fissile Content (FGE of U-235)		9R. Enrichment (% of U-235)							
10R. Chemical Form		(Reserved)							

☐ 1M. Constituent Continuation Sheet(s) _____ through _____ attached.

RCRA/TSCA Determination Method			Determination	Yes	No
☐ 2M. Analysis LSID #(s)		☐ 3M. Process Knowledge UCN 20116#	4M. RCRA Waste		
			5M. TSCA Waste		
			(Reserved)		

6M. PCB ☐ Yes ☐ No	7M. PCB Concentration ppm	8M. PCB Source Conc. ppm	9M. PCB Source Concentration Range (ppm) ☐ 2 - 49.99 ☐ 50 - 499.99 ☐ >/= 500

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

I certify that I have been provided sufficient information concerning the above described waste to apply the requirements of ES/WM-10, Waste Acceptance Criteria for the Oak Ridge Reservation, and, based on this information, I further certify that this waste material:

1) Is accurately described above and packaged in accordance with Waste Certification Procedure _____ Rev Date _____, and

2) Meet the Waste Acceptance Criteria for the RCRA MIXED AND/OR TSCA RADIOACTIVE WASTE Category, as stated in ES/WM-10.

3) Or, if applicable, meets the conditions stipulated in variance number _____

I further certify that all required documentation is attached to the UCN 2109 and that, to the best of my knowledge and belief, the information on the UCN 2109 is complete and accurate. I am currently authorized to perform Waste Certifier functions.

Signature Waste Certifier	Printed Name	Badge Number	Date

84. Derivative Classifier	Badge	Date

Energy Systems Waste Disposal Request (UCN-2109G) Instructions
Attachment D RCRA Mixed and/or TSCA Radioactive Waste

All items must be completed. N/A items that are "not applicable" unless instructions indicate otherwise.

REFERENCE FROM WID (UCN-2109)

I1. Waste Item ID Number: The unique ID number of the waste item.

C1. Container ID Number: The unique ID number of the shipping/storage container for the waste.

PROHIBITED ITEMS

Are the following present in the waste (all items must be marked Yes or No):

1D. Chemically Incompatible Substances: Example acids and bases.

WASTE DESCRIPTION

2D. Chelating Agents: Does the waste contain any chelating agents? (Check Yes or No)

3D. Ion Exchange Resins: Does the waste contain any ion exchange resins? (Check Yes or No).

4D. pH: Report the pH value for aqueous wastes.

5D. Beryllium: Report the quantity and units of measure (ppm or grams) for waste containing Beryllium.

6D. Corrosivity to Steel: Report the corrosivity to steel by the method described in 40 CFR 261.22 for nonaqueous liquid wastes.

7D. Flashpoint: Report the flashpoint of the waste and check the appropriate units of measure (Celsius or Fahrenheit).

8D. Boiling Point: Report the boiling point of the waste if the flashpoint (7D) is below 140°F. (Check Celsius or Fahrenheit).

RADIOISOTOPES

1R. Radioisotopes Continuation Sheet(s): Check this box if continuation sheets are attached and include the page numbers.

RADIOISOTOPE DETERMINATION METHOD

2R. Analysis LSID #(s): Report the Lab Sample Id (LSID) for any radioisotope analyses and attach the results of the analyses.

3R. Process Knowledge UCN 20116#: Identify the form ID, if process knowledge was used for radioisotope characterization.

4R. Radioisotope: Identify the radioisotopes that comprise greater than or equal to 1% of the total activity in the waste package. ^{14}C, ^{36}Cl, ^{230}Th, ^{232}Th, ^{99}Tc, and all isotopes with atomic number >92 must be identified if present in any quantity.

5R. Quantity: Report the quantity of each radioisotope identified in 4R.

6R. Units: Check Ci (curies) or G (grams).

7R. NARM: Is the isotope identified in 4R a Naturally-occurring and Accelerator-produced Radioactive Material? Check Yes or No.

8R. Fissile Content (FGE of U-235): Report the fissile gram-equivalent (FGE) of ^{235}U present.

9R. Enrichment (% of U-235): Report the percent enrichment of the uranium ^{235}U present.

10R. Chemical Form: The chemical form of the waste material.

CONSTITUENTS

1M. Constituent Continuation Sheet(s)- Check this box if continuation sheets are attached and include the page numbers.

RCRA/TSCA DETERMINATION METHOD

2M. Analysis LSID #(s): Report the Lab Sample Id (LSID) for any RCRA/TSCA analyses and attach the results of the analysis.

3M. Process Knowledge UCN 20116#: Identify the form ID, if process knowledge was used for RCRA/TSCA characterization.

4M. RCRA Waste: Does the waste contain any RCRA regulated materials? Check Yes or No.

5M. TSCA Waste: Does the waste contain any TSCA regulated materials? Check Yes or No.

6M. PCB: Does the waste contain any PCBs? Check Yes or No.

7M. PCB Concentration: Report the concentration in parts per million (ppm) of PCB's in the waste.

8M. PCB Source Concentraion: Report the PCB source concentration where the waste originated, if known.

9M. PCB Source Range Conc.: Check the appropriate PCB source concentration range where the waste originated.

11M. Substance ID: Give the Chemical Abstract Service (CAS) registry number or MSDS record number of the chemical constituents.

12M. Conc: Report the concentration for the substance ID.

13M. Units: Identify the concentration units of measure.

14M. EPA Code: Give the EPA hazardous waste code number determined from the waste characteristics.

15M. Substance Name: The common name of the chemical substance.

CERTIFICATION INFORMATION

Provide the Waste Certification Procedure number and the revision date used to certify the Waste Acceptance Criteria have been meet. If a variance has been approved provide the unique variance number. The signature of the Waste Certifier , printed name, badge number and date.

S4. Derivative Classifier: Determines the waste item security classification and reviews the form with the UCN 2109 for classified information.

MARTIN MARIETTA

LIQUID WASTE TREATED AT K-25

ATTACHMENT E

Referenced from WID (UCN-2109)	
Waste Item ID Number	C1. Container ID. No.

ALL YES/NO RESPONSES ARE REQUIRED

Prohibited Items	Yes	No
1E. Fissile Materials		
2E. Classified Waste		
3E. Transuranic Radioisotopes (> 100 nCi/gm)		

	Waste Characterization	YES	NO		YES	NO
☐ 4E. Analytical Statement Of Work #	6E. CNF Treatment Candidate			11E. Liquid Bulking Candidate		
	7E. Physical/Chemical Parameters (Attach I)			12E. Constituents For K-1202 or K-1420-A Tanks (Attach V)		
☐ 5E. Process Knowledge UCN 20116#	8E. Metals (Attach II)					
	9E. Radiological Constituents (Attach III)			RESERVED		
	10E. Organic Constituents (Attach IV)					

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

I certify that I have been provided sufficient information concerning the above described waste to apply the requirements of ES/WM-10, Waste Acceptance Criteria for the Oak Ridge Reservation, and, based on this information, I further certify that this waste material:

1) Is accurately described above and packaged in accordance with Waste Certification Procedure ____________
Rev Date ____________, and

2) Meet the Waste Acceptance Criteria for the LIQUID WASTE TREATED AT K-25 Category, as listed in ES/WM-10.

3) Or, if applicable, meets the conditions stipulated in variance number ____________

I further certify that all required documentation is attached to the UCN 2109 and that, to the best of my knowledge and belief, the information on the UCN 2109 is complete and accurate. I am currently authorized to perform Waste Certifier functions.

Signature Waste Certifier	Printed Name	Badge Number	Date

S4. Derivative Classifier	Badge	Date

UCN-2109E (2-95)

Energy Systems Waste Disposal Request (UCN-2109H) Instructions
Attachment E Liquid Waste Treated at K-25

All items must be completed. N/A items that are "not applicable" unless instructions indicate otherwise.

REFERENCE FROM WID (UCN-2109)

I1. Waste Item ID Number: The unique ID number of the waste item.

C1. Container ID Number: The unique ID number of the shipping/storage container for the waste.

PROHIBITED ITEMS

Is the following present in the waste (all items must be marked Yes or No)

1E. Fissile Materials

2E. Classified Waste: Waste that is classified for security reasons

3E. Transuranic Radioisotopes (>100 nCi/gm)

WASTE CHARACTERIZATION

4E. Analytical Statement of Work#: Enter the number of the MMES Analytical Project Office, Statement of Work (SOW) which was used to request sampling and analysis of the waste.

5E. Process Knowledge UCN 20116#: Identify the form ID, if process knowledge was used for any characterization.

6E. CNF Treatment Candidate: Is this waste a candidate for treatment at CNF? (Check Yes or No).

7E. Physical/Chemical Parameters (Attach I): Has the Physical/Chemical Parameters (Attachment I) from the SOW been attached? (Check Yes or No).

8E. Metals (Attach II): Has the Metals (Attachment II) from the SOW been attached? (Check Yes or No).

9E. Radiological Constituents (Attach III): Has the Radiological Constituents (Attachment III) from the SOW been attached? (Check Yes or No).

10E. Organic Constituents (Attach IV): Has the Organic Constituents (Attachment IV) from the SOW been attached? (Check Yes or No).

11E. Liquid Bulking Candidate: Is this waste a candidate for treatment at K 1202/K-1420-A Bulking Tanks? Check Yes or No.

12E. Constituents For K-1202 or K-1420-A Tanks (Attach V): Has the Constituents for K-1202 or K-1420-A Tanks (Attachment V) from the SOW been attached? Check Yes or No.

CONSTITUENTS

11M. Substance ID: Give the Chemical Abstract Service (CAS) registry number or MSDS record number of the chemical constituents.

12M. Conc: Report the concentration for the substance ID.

13M. Units: Identify the concentration units of measure.

14M. EPA Code: Give the EPA hazardous waste code number determined from the waste characteristics.

15M. Substance Name: The common name of the chemical substance.

CERTIFICATION INFORMATION

Provide the Waste Certification Procedure number and the revision date used to certify the Waste Acceptance Criteria have been meet. If a variance has been approved provide the unique variance number. The signature of the Waste Certifier , printed name, badge number and date.

S4. Derivative Classifier: Determines the waste item security classification and reviews the form with the UCN 2109 for classified information.

MARTIN MARIETTA

LIQUID WASTE TREATED AT ORNL

ATTACHMENT F

Referenced from WID (UCN-2109)	
aste Item ID Number	C1. Container ID. No.

Time Period		Drain Location		
1F. Beginning	2F. End	3F. Building	4F. Room	5F. Drain

ALL YES/NO RESPONSES ARE REQUIRED

Liquid Low Level Waste

6F. LLLW Logsheet #	7F. LLLW Logsheet #	8F. LLLW Logsheet #	9F. LLLW Logsheet #	10F. LLLW Logsheet #	11F. LLLW Logsheet #

12F. Prohibited Items	Yes	No	If yes, Variance #	12F. Prohibited Items	Yes	No	If yes, Variance #
RCRA waste as specified in ES/WM-10 Section 4.6.1				TSCA waste as specified in ES/WM-10 Section 4.6.1 (including PCBs > 2 ppm at source)			
Resultant solutions of U-233, U-235, Pu-239 or Pu-241 < 100 parts by weight of U-238 or Th-232 per part by weight of the fissile isotope(s)				Total specific activity of solutions containing TRU isotopes or U-233 > 3.7 x E6 Bq/kg (100 nCi/g)			
Container low specific activity exceed limits specified in Table 4.6.1 of ES/WM-10				Total radionuclide activity concentration > 2 x E10 Bq/L (2 Ci/gal) Sr-90 equivalent			
Waste below minimum concentration levels as listed in Table 4.6.2 of ES/WM-10				Pathogens, infectious waste or other etiological agents			
Tanker waste surface radiation limits > 200 mr/hr				Free chelating or complexing agents > 0.04% by weight			
Bottled waste surface radiation limits > 50 mr/hr				Explosive or pyrophoric material			
Halogen Acids				Sanitary Waste			

Process Waste

13F. Prohibited Items	Yes	No	If yes, Variance #	13F. Prohibited Items	Yes	No	If yes, Variance #
Solutions with radionuclide concentrations above limits listed in Table 4.6.3 of ES/WM-10				Streams containing heavy metals above limits listed in Table 4.6.3 of ES/WM-10			
Organics over the NRWTP WAC limits listed in Table 4.6.4				Free organic chelating agents			
Sanitary waste				Water-soluble organics			

Nonradiological Waste

14F. Prohibited Items	Yes	No	If yes, Variance #	14F. Prohibited Items	Yes	No	If yes, Variance #
Containment concentrations above the limits in Table 4.6.4 of ES/WM-10				Radionuclide levels exceeding the DCG levels specified by Figure III-1 of DOE Order 5400.5			
Sanitary waste				Free chelating agents			

I certify that I have been provided sufficient information concerning the above described waste to apply the requirements of ES/WM-10, Waste Acceptance Criteria for the Oak Ridge Reservation, and, based on this information, I further certify that this waste material:

1) Is accurately described above and packaged in accordance with Waste Certification Procedure _____ Rev Date _____, and

2) Meet the Waste Acceptance Criteria for the LIQUID WASTE TREATED AT ORNL Category, as listed in ES/WM-10.

3) Or, if applicable, meets the conditions stipulated in variance number _____

I further certify that all required documentation is attached to the UCN 2109 and that, to the best of my knowledge and belief, the information on the UCN 2109 is complete and accurate. I am currently authorized to perform Waste Certifier functions.

Signature Waste Certifier	Printed Name	Badge Number	Date

S4. Derivative Classifier	Badge	Date

UCN-2109J (2-95)

Energy Systems Waste Disposal Request (UCN-2109J) Instructions
Attachment F Liquid Waste Treated at ORNL

All items must be completed. N/A items that are "not applicable" unless instructions indicate otherwise.

REFERENCE FROM WID (UCN-2109)

I1. Waste Item ID Number: The unique ID number of the waste item
C1. Container ID Number: The unique ID number of the shipping/storage container for the waste

TIME PERIOD

1F. Beginning: Enter the beginning date
2F. End: Enter the end date

DRAIN LOCATION

3F. Bldg: Enter the building where the drain is located
4F. Room: Enter the room where the drain is located
5F. Drain: Enter the drain number

Complete one of the following sections that applies:

LIQUID LOW LEVEL WASTE

6F-11F. LLLW Logsheet#: Enter the LLLW logsheet number

PROHIBITED ITEMS

Is the following present in the waste (all items must be marked Yes or No):
12F. Prohibited Items: Answer Yes or No to each of the prohibited items. If a variance applies indicate the variance number.

PROCESS WASTE

PROHIBITED ITEMS

Is the following present in the waste (all items must be marked Yes or No):
13F. Prohibited Items: Answer Yes or No to each of the prohibited items. If a variance applies indicate the variance number.

NONRADIOLOGICAL WASTE

PROHIBITED ITEMS

Is the following present in the waste (all items must be marked Yes or No):
13F. Prohibited Items: Answer Yes or No to each of the prohibited items. If a variance applies indicate the variance number.

CERTIFICATION INFORMATION

Provide the Waste Certification Procedure number and the revision date used to certify the Waste Acceptance Criteria have been meet. If a variance has been approved provide the unique variance number. The signature of the Waste Certifier, printed name, badge number and date.
S4. Derivative Classifier: Determines the waste item security classification and reviews the form with the UCN 2109 for classified information

MARTIN MARIETTA

LIQUID WASTE TREATED AT Y-12

ATTACHMENT G

Referenced from WID (UCN-2109)	
Waste Item ID Number	C1. Container ID. No.

ALL YES/NO RESPONSES ARE REQUIRED

Prohibited Items	Yes	No
1G. Waste < 50% Water		
2G. RCRA U, P, or K listed waste		
3G. Transuranic Radioisotopes (> 100 nCi/gm)		
4G. TSCA Waste		

5G. pH	6G. Flashpoint ☐ deg/Celsius ☐ deg/Fahrenheit	7G. Volatile Organic Analysis mg/L	8G. Chloride mg/L

9G. Acidity mg/L	10G. Chromium mg/L	11G. Cyanide mg/L	12G. Nitrate mg/L	13G. Nickel mg/L	14G. Silver mg/L	15G. Zinc mg/L
16G. Cadmium mg/L	17G. Copper mg/L	18G. Lead mg/	19G. Mercury mg/L	20G. Oil and Grease mg/L	21G. Phenols mg/L	22G. Iron mg/L
23G. Aluminum mg/L	24G. Calcium mg/L	25G. Fluoride mg/L	26G. Sulfates mg/L	27G. Lithium mg/L	28G. Total Organic Carbon mg/L	29G. Density lb/gal

☐ 1R. Radioisotope Continuation Sheet(s) _____ through _____ attached.

Radioisotope Determination Method			4R. Radioisotope	5R. Quantity	6R. Units Ci G pci/L	7R. NARM Yes No
☐ 2R. Analysis LSID #(s)		☐ 3R. Process Knowledge UCN 20116#				

8R. Fissile Content FGE U-235	9R. Enrichment % U-235	10R. Chemical Form
11R. Duplicate Enrichment % U-235	12R. Total Uranium pci/L	

☐ 1M. Constituent Continuation Sheet(s) _____ through _____ attached.

RCRA/TSCA Determination Method		
☐ 2M. Analysis LSID #(s)		☐ 3M. Process Knowledge UCN 20116#

7M. PCB Concentration ppm	8M. PCB Source Conc. ppm	9M. PCB Source Concentration Range (ppm) ☐ 2 - 49.99 ☐ 50 - 499.99 ☐ >/= 500

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

I certify that I have been provided sufficient information concerning the above described waste to apply the requirements of ES/WM-10, Waste Acceptance Criteria for the Oak Ridge Reservation, and, based on this information, I further certify that this waste material:

1) Is accurately described above and packaged in accordance with Waste Certification Procedure _____ Rev Date _____, and

2) Meet the Waste Acceptance Criteria for the LIQUID WASTE TREATED AT Y-12 Category, as listed in ES/WM-10.

3) Or, if applicable, meets the conditions stipulated in variance number _____

I further certify that all required documentation is attached to the UCN 2109 and that, to the best of my knowledge and belief, the information on the UCN 2109 is complete and accurate. I am currently authorized to perform Waste Certifier functions.

Signature Waste Certifier	Printed Name	Badge Number	Date

54. Derivative Classifier	Badge	Date

UCN-2109A (2-95)

Energy Systems Waste Disposal Request (UCN-2109K) Instructions
Attachment G Liquid Waste Treated at Y-12

All items must be completed. N/A items that are "not applicable" unless instructions indicate otherwise.

REFERENCE FROM WID (UCN-2109)

I1. Waste Item ID Number: The unique ID number of the waste item

C1. Container ID Number: The unique ID number of the shipping/storage container for the waste

PROHIBITED ITEMS

Is the following present in the waste (all items must be marked Yes or No):

1G. Waste <50% Water: Does the waste contain <50% water?

2G. RCRA U, P or K Listed Waste

3G. Transuranic Radioisotopes (>100 nCi/gm)

4G. TSCA Waste

WASTE DESCRIPTION

5G. pH: Report the pH value of the waste.

6G. Flashpoint: Report the flashpoint of the waste and check the appropriate units of measure (Celsius or Fahrenheit).

7G-29G For 7G through 29G report the amount of the specified material in mg/L

RADIOISOTOPES

1R. Radioisotopes Continuation Sheet(s): Check this box if continuation sheets are attached and include the page numbers.

RADIOISOTOPE DETERMINATION METHOD

2R. Analysis LSID #(s): Report the Lab Sample Id (LSID) for any radioisotope analyses and attach the results of the analyses.

3R. Process Knowledge UCN 20116#: Identify the form ID, if process knowledge was used for radioisotope characterization.

4R. Radioisotope: Identify the radioisotopes that comprise greater than or equal to 1% of the total activity in the waste package. ^{14}C, ^{36}Cl, ^{230}Th, ^{232}Th, ^{99}Tc, and all isotopes with atomic number >92 must be identified if present in any quantity

5R. Quantity: Report the quantity of each radioisotope identified in 4R.

6R. Units: Check pCi/l.

7R. NARM: Is the isotope identified in 4R a Naturally-occurring and accelerator-produced radioactive material? Check Yes or No.

8R. Fissile Content (FGE of U-235): Report the fissile gram-equivalent (FGE) of ^{235}U present.

9R. Enrichment (% of U-235): Report the percent enrichment of the uranium ^{235}U present

10R Chemical Form: The chemical form of the waste material.

11R. Duplicate Enrichment (% of U-235): Report the percent enrichment of the uranium ^{235}U present.

12R Total Uranium: Report the total uranium in pCi/l

CONSTITUENTS

1M. Constituent Continuation Sheet(s)- Check this box if continuation sheets are attached and include the page numbers.

RCRA/TSCA DETERMINATION METHOD

2M. Analysis LSID #(s): Report the Lab Sample Id (LSID) for any RCRA/TSCA analyses and attach the results of the analysis

3M. Process Knowledge UCN 20116#: Identify the from ID, if process knowledge was used for RCRA/TSCA characterization.

7M. PCB Concentration: Report the concentration in parts per million (ppm) of PCB's in the waste.

8M. PCB Source Concentration: Report the PCB source concentration where the waste originated, if known.

9M. PCB Source Range Conc: Check the appropriate PCB source range concentration where the waste originated.

11M. Substance ID: Give the Chemical Abstract Service (CAS) registry number or MSDS record number of the chemical constituents

12M. Conc: Report the concentration for the substance ID.

13M. Units: Identify the concentration units of measure

14M. EPA Code: Give the EPA hazardous waste code number determined from the waste characteristics.

15M. Substance Name: The common name of the chemical substance.

CERTIFICATION INFORMATION

Provide the Waste Certification Procedure number and the revision date used to certify the Waste Acceptance Criteria have been meet. If a variance has been approved provide the unique variance number. The signature of the Waste Certifier, printed name, badge number and date.

S4. Derivative Classifier: Determines the waste item security classification and reviews the form with the UCN 2109 for classified information

MARTIN MARIETTA

CONSTITUENT CONTINUATION SHEET

(Continuation Page ___ of ___)

Referenced from WID (UCN-2109)	
[redacted] Waste Item ID Number	C1. Container ID. No.

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
[redacted] Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
15M. Substance Name			

11M. Substance ID	12M. Conc.	13M. Units	14M. EPA Code
[redacted] Substance Name			

Energy Systems Waste Disposal Request (UCN-2109L) Instructions
Constituent Continuation Sheet

All items must be completed. N/A items that are "not applicable" unless instructions indicate otherwise.

REFERENCE FROM WID (UCN-2109)

I1. Waste Item ID Number: The unique ID number of the waste item.

C1. Container ID Number: The unique ID number of the shipping/storage container for the waste.

CONSTITUENTS

11M Substance ID: Give the Chemical Abstract Service (CAS) registry number or MSDS record number of the chemical constituents.

12M. Conc: Report the concentration for the substance ID.

13M. Units: Identify the concentration units of measure.

14M. EPA Code: Give the EPA hazardous waste code number determined from the waste characteristics.

15M. Substance Name: The common name of the chemical substance.

MARTIN MARIETTA

RADIOISOTOPE CONTINUATION SHEET

(Continuation Page ____ of ___)

Referenced from WID (UCN-2109)	
I1. Waste Item ID Number	C1. Container ID. No.

4R. Radioisotope	5R. Quantity	6R. Units			7R. NARM		4R. Radioisotope	5R. Quantity	6R. Units			7R. NARM	
		Ci	G	pci/L	Yes	No			Ci	G	pci/L	Yes	No

UCN-2109M (2-95)

Energy Systems Waste Disposal Request (UCN-2109M) Instructions
Radioisotopes Continuation Sheet

All items must be completed. N/A items that are "not applicable" unless instructions indicate otherwise.

REFERENCE FROM WID (UCN-2109)

I1. Waste Item ID Number: The unique ID number of the waste item.

C1. Container ID Number: The unique ID number of the shipping/storage container for the waste.

RADIOISOTOPES

4R. Radioisotope: Identify the radioisotopes that comprise greater than or equal to 1% of the total activity in the waste package. ^{14}C, ^{36}Cl, ^{230}Th, ^{232}Th, ^{99}Tc, and all isotopes with atomic number >92 must be identified if present in any quantity.

5R. Quantity: Report the quantity of each radioisotope identified in 4R.

6R. Units: Check Ci (curies) or G (grams). Check pCi/l only if Attachment G was completed.

7R. NARM: Is the isotope identified in 4R a Naturally-occurring and accelerator-produced radioactive material? Check Yes or No.

Container Packing List (UCN-20300) Form User Instructions

PURPOSE: The Container Packing List (CPL) form is used to describe a single standard shipping/storage container which holds multiple, separately identified waste items. This type of packing is often referred to as 'lab-packing'. It differs from a 'bulking operation' in that the waste items, once packed, retain their original identities and characteristics. The CPL lists the type and identity of the standard shipping/storage container, the identities of all of the waste items packed inside it, and any applicable handling information.

Multiple, separately identified waste items which are being lab-packed in the field often originate from several different waste generators and locations within the generating organization. A Generator Certification Officer is responsible for ensuring that each waste items packed in the container is identified with a properly completed Waste Item Description (WID) and attached barcode label, verifying that the container is properly sealed and labeled, and that the waste package meets all applicable site criteria for transfer to the site waste management organization.

GENERAL GUIDELINES

- If corrections are made on the Waste Pickup Request (WPR) they must be done by drawing a single line through the error, initial it, and date it. Do not black out the entire error. The error must be readable for auditing purposes. **WHITEOUT MUST NOT BE USED!**
- The forms shall be completed in a manner such that they can be easily read and understood. The data entries should be readily reproducible with standard photocopy machines, therefore black, waterproof ink is recommended.
- When copying the forms for use make sure that the copy is of a good quality and that the copy is centered well on the page.
- Electronic or photo copied signatures are not acceptable.
- Please ensure that all compulsory parts of the form has been completed.

CONTAINER IDENTIFICATION

C1. Container ID No. (Compulsory)
The unique ID number of the shipping/storage container copied from the container barcode label.
Example: X10C9300123

C2. Container Type (Compulsory)
The container type code of the shipping/storage container. Select the most detailed container type code available from the following list.
Examples: DRUMS55, DRUMS30

C3. Holding Site (Compulsory)
The site (plant) where the container was held during waste accumulation.
Examples: X10, Y12, K25

C4. Holding Facility (Compulsory)
The facility (building) where the waste container was held during waste accumulation.
Example: 4500N

C5. Holding Room/Area (Compulsory)
The room/area identifier where the waste container was held during waste accumulation.
Example: 125L

CONTAINER PACKING LIST

I1. Waste Item ID Number (Compulsory)
The unique ID number of each waste item in the container from the barcode labels attached to the waste items.
Example: X10I9300001

HANDLING INFORMATION

H1. Handling Instructions (Optional)

General handling instructions for the waste.

Examples: See MMES MSDS for instructions; Face shield required

H2. Respirator

This is not completed for ORNL generators.

H3. Cartridge

This is not completed for ORNL generators.

H4. HP Survey Data **(completed by Health Physics technician)** (Compulsory)

HP Tag Color:

The color code of the survey tag (G, Y, B, & R)

Surface Contamination:

The count rate from a surface swipe (dpm/100 cm2)

Dose Rate at Surface:

The dose rate measured at the surface (mrem/hr)

Dose Rate at 1 Meter:

The dose rate measured at 1 meter (mrem/hr)

Instrument ID:

The health physics instrument ID number.

Format: A99999

SIGNATURES and APPROVALS

S1. Certification Officer (Compulsory)

The signature, date and badge number of the Generator Certification Officer, certifying that the information on the CPL is complete and accurate, that the waste package complies with waste acceptance criteria of the treatment, storage or disposal facility to which it is being submitted and that the waste was packaged by individuals with appropriate training.

S2. H.P. Technician (Compulsory)

The signature and badge number of the H.P. Technician certifying that the HP survey information is complete and accurate.

S3. WMO

The signature and badge number of the Waste Management Organization (WMO) officer verifying that the CPL and all associated WID forms have been completed properly.

MARTIN MARIETTA

CONTAINER PACKING LIST

CONTAINER IDENTIFICATION

C1. Container ID. No.	C2. Container Type	C3. Holding Site	C4. Holding Facility	C5. Holding Room/Area

CONTAINER PACKING LIST

I1. Waste Item ID Number	I1. Waste Item ID Number	I1. Waste Item ID Number	I1. Waste Item ID Number

HANDLING INFORMATION

H1. Handling Instructions	H2. Respirator	H3. Cartridge Type	H4. HP Tag Color	Surface Contamination (dpm/100 cm²) Transfer.	Surface Contamination (dpm/100 cm²) Direct Read.	Dose Rate at Surface (mrem/hr)	Dose Rate at 1 Meter (mrem/hr)	Instrument Identification
	☐ None ☐ Half ☐ Full		Alpha					
			Beta/Gamma					
			Neutron					

SIGNATURES and APPROVALS

S1. Certification Officer	Badge	Date	S2. HP Technician	Badge	Date
S3. WMO Officer	Badge	Date	S4.	Badge	Date

INSTRUCTIONS FOR COMPLETING THE UCN-2822 FORM
"REQUEST FOR STORAGE OR DISPOSAL OF RADIOACTIVE SOLID WASTE OR SPECIAL MATERIALS"

The following information is to assist you in the proper completion of the UCN-2822 Form. The form must be completed in ink.

Date: Date waste is being sent to burial ground.

Origin of Waste: Building where waste was generated. Always use a building or area number. Comment section may be used to further describe the origin of waste.

G.C.O. Signature: Legible signature of Generator Certification Official. Also include G.C.O. Badge Number, Division Code, Phone Number, and Mailing Address. Must be Martin Marietta employee.

Total Volume: Total volume of waste including the outer package in cubic feet.

Combustible Volume: Amount in cubic feet of the total volume that is combustible.

Weight: Total weight of waste and container in pounds.

UCN 2681 No.: Only applicable if waste has a UCN-2681, *ORNL Nuclear Materials Intra-Laboratory Transfer.*

Charge/Work Order No.: Active charge or work order number.

Waste Class Code: Choose only one of the following codes that best describes the waste:

Code		Code Description
1	-	Contact Handled TRU or U-233 >100nCi/gram.
2	-	Uranium/Thorium
3	-	Fission Product.
4	-	Induced Activity
5	-	Tritium
6	-	Remote Handled TRU or U-233 >100nCi/gram.
7	-	TRU or U-233 <100nCi/gram.
9	-	Landfill/Suspect
A	-	Asbestos, contaminated and suspect/brown tag.
P	-	Resource lead

Waste Type Code: Choose only one of the following codes that best describes the waste:

Code		Code Description
BW	-	Biological Waste
CE	-	Contaminated Equipment
DD	-	Decontamination Debris
DS	-	Dry Solids
SS	-	Solidified Sludge

RCRA Present? (Y/N): Indicate presence/absence of RCRA materials (TRU waste packages only).

Asbestos: For radioactively contaminated asbestos material. Enter preassigned number from the form UCN-13386, *Request for the Disposal of Asbestos or Material Containing Asbestos.*

Package Type Code: Choose one code each that best describes the inner and outer packages. If the containers listed do not provide adequate size or shielding, other containers may be used subject to the approval of Radioactive Solid Waste Operations supervisor:

Code		Code Description
1	-	55 Gallon Stainless Steel Drum (volume 7.5 ft^3, max. weight 400 lbs)
4	-	6 inch Concrete Cask (58 ft^3 volume)
5	-	12 inch Concrete Cask (23 ft^3 volume)
6	-	55 Gallon 17H drum (volume 7.5 ft^3, max. weight 400 lbs)
8	-	Wooden box: Provide dimensions in comment section.
9	-	Other: Provide description in comment section.
11	-	Plastic
12	-	Dumpster: Provide dumpster number.
13	-	None
14	-	Lead Shielded Carrier
15	-	Metal box: Provide dimensions in the comment section. Sizes other than 4'x 4'x 6', (96 ft^3) require RSWO approval.

Principal Isotopes Contributing More Than 5% Total Package Activity: List the principal isotopes and their quantity in Curies and/or grams in the appropriate columns as in the following examples: Cs-137 or Sr-90, etc. 1.0E-4 or $1x10^{-4}$

List the quantity of Fissile isotopes and Uranium/Thorium in grams, all other quantities in curies. Totals for the isotopes from the accompanying log-in data sheets (TX-5352 or UCN-16114) should be represented in the appropriate column. Log-in data sheet(s) must be complete, approved, and attached to the UCN-2822.

General Waste Description/Comments: Provide a brief description or general comments, as appropriate.

Radiation Protection Section: This section must be completed by Radiation Protection before the waste will be accepted by RSWO. Transferable contamination and dose rate data is for the exterior of the outer package. Dose rate for both the surface, and at one meter, must be provided for the exterior of the outer package. Provide survey instrument serial number(s).

Radioactive Solid Waste Operations: Approval of RSWO Field Representative. Required before waste can be accepted. G.C.O. section (including Principle Isotopes) and Radiation Protection Section of the UCN-2822 must be complete.

REQUEST FOR STORAGE OR DISPOSAL OF
RADIOACTIVE SOLID WASTE OR SPECIAL MATERIALS

Number 84941

GCO Section

(GCO and Radiation Protection Sections Must Be Complete Before Arranging Material Transfer

	Origin of Waste	G.C.O. Signature (Legible)	Badge No.	Div. Code	Phone No.

Mailing Address (Bldg/MS)	Total Volume (ft^3)	Comb. Volume (ft^3)	Weight (lbs)	UCN 2681 No.

Charge/Work Order No.	Waste Class Code	Waste Type Code	PACKAGE TYPE CODES		

RCRA Present (Y/N)	Asbestos - UCN 13386 No.	Inner	Outer	Dumpster No.

Principle Isotopes Contributing More Than 5% Total Package Activity

(Report Fissile, Uranium/Thorium in Grams)

Identity	Curies	Grams	Identity	Curies	Grams
1.			8.		
2.			9.		
3.			10.		
4.			11.		
5.			12.		
6.			13.		
7.			14.		

General Waste Description/Comments:

RADIATION PROTECTION

EXTERIOR TRANSFERABLE CONTAMINATION:

Alpha _____ dpm/100 cm^2 Beta/Gamma _____ dpm/100 cm^2

DOSE RATE: Beta/Gamma: Surface _____ mrem/hr @ one meter _____ mrem/hr

Neutron: Surface _____ mrem/hr @ one meter _____ mrem/hr

Survey Instrument Serial Number:

Radiation Protection Signature	Badge No.	Date

RADIOACTIVE SOLID WASTE OPERATIONS

RSWO Signature	Badge No.	Date

Basic Description (DOT)	Cost Symbol	Adjustment

Comments

	WSR Number:			ATN

UCN-2822 (3 9-92)

DISTRIBUTION WHITE - SWSA FOREMAN FORWARDS TO DMC
BLUE - RETAINED BY SWSA FOREMAN
CANARY - RETAINED BY GENERATOR

FORM UCN-20118

Instructions

In some cases, a generator may be unable to meet certain certification related requirements. A variance may be granted if it is determined that conditions exist which make it exceedingly difficult or impossible to meet a requirement, or if it is determined that the compliance status of either the generator or ESWMO is not compromised by the variance. Variances will not be granted due to convenience, and all requests must be thoroughly documented by the generator.

Generator Actions:
(NOTE: Direct any questions on completion, submittal or use of this form to the Site WCG.)

1) Complete all sections on the front page of UCN-20118, and sign at the bottom.
2) Submit completed form UCN-20118 to ESWMO.
3) Sign *approved* request. (Note that denied variance requests do not require the generator's signature.)

To Be Completed by the Requestor:

Name/Badge No: _____ Phone: _____ Address: _____ Division/Department: _____

Describe (***in detail***) the situation or process in which the waste was generated : _____

Specify the requirement(s) which cannot be met and provide (***in detail***) the reason(s) why :

(EP-710): _____

(ES/WM-10): _____

(WCP, Other): _____

For what period of time is the variance requested? _____

What actions will be taken to bring the waste and/or the program into full compliance? (Provide a schedule) _____

_____ _____ Requestor

Signature Date

Variance Request No. _____

Reviewed by (Print Name/Signature): _____ Date Review Completed: _____

Is this variance request a continuation of an existing request? If so, is there enough justification for continuance? _____

_____

_____

Variance is GRANTED. The following conditions apply: _____

_____

_____

_____

_____

_____

_____

Variance Expiration Date: _____

Variance is DENIED. The following reasons apply: _____

_____

_____

_____

_____

_____

_____

Concurrence: (Print Name, Sign, Provide Badge Number, Date)

_____ _____ ESWMO Site Waste Certification Group Representative — Date

_____ _____ Treatment, Storage or Disposal Facility Representative — Date

_____ _____ ESWMO Central Waste Certification Coordinator (Required Only for WAC Variances) — Date

_____ _____ Requestor (Required only if Variance is Approved) — Date

TX-5352A
(3/90)

DATA LOG SHEET FOR PACKAGING TRU MIXED WASTE

[Supplement to Form TX-5352. An entry is required for each column. See instruction sheet for directions.]

Drum ATN: _____
Building No.: _____
Room No.: _____

Content Code: ☐ OR125A ☐ OR125B

1. Pak No.	2. Date	3. Description of Hazardous Material	4. Haz. Det. (A/B)	5. Quantity	6. Hazard Information	7. EPA Waste No.	8. Signature	9. Data Log Sheet Verification	
								Date	Signature

GCO Signature: _____

Page _____ **of** _____

INSTRUCTIONS FOR COMPLETING "THE DATA LOG SHEETS FOR PACKAGING TRU MIXED WASTE" (TX-5352A)

TRU mixed waste is TRU waste that also contains hazardous materials.. Only those hazardous materials that are co-contaminated with TRU radionuclides may be placed in a TRU waste container. The supplemental data log sheet for TRU mixed waste is to be completed whenever hazardous materials (defined by 40CFR 261 and WIPP/DOE-069) are placed in the waste container. This will be indicated by a "Yes" entry in column 9 of the primary data log sheet for the TRU waste packet. Both log sheets are required for TRU mixed waste.

NOTE: ALL entries requesting signatures must be signed by the person responsible -- initials are not acceptable.

DATA ENTRIES AT THE TOP OF THE PAGE

Drum ATN - Drum accountability and traceability Number. This number is located on the bar coded label affixed to the drum. Do not use drum without a bar code label attached.

Building No. - Building number in which the waste was generated.

Room No. - Room number or other information that identifies the specific location, within the building, where the waste drum is located.

Content Code - Check the appropriate block. The correct "Content Code" identification can be obtained from the Generator Certification Official, or from the certification document ORNL/TM-10322.

DATA COLUMN ENTRIES

1. Packet Number (Pak No.) - Waste packet number. All waste material placed in the container must be properly bagged or sealed. The packet number should be the same as that used on Form TX-5352.

2. Date - The date that the waste material or packet is placed in the container.

3. Description of Hazardous Material - Describe the physical characteristics of the hazardous material contained in the waste packet. Examples are: silver plated electrodes, cadmium coated samples, lead brick, lead pigs, lead sheet, leaded rubber gloves, solvent contaminated wipes, mercury vapor lamps, mercury thermometer, etc.

4. Hazardous Determination (Haz. Det.) - Indicate the method used to determine that the waste is hazardous. If the determination was made by analytical testing, mark an "A" in the column. If the determination was made based on the generator's knowledge of the process mark an "B" in the column.

   A - Analytical Testing
   B - Basic Process Knowledge

5. Quantity - Enter your best estimate of the total amount of hazardous material in the waste packet The entry should be made in terms of weight and volume including dimensions. For example, two (2 in. x 3 in. x 6 in. lead bricks = 5 lbs each, or 1 qt of wipes = 1 lb total.

6. Hazard Information - Describe the hazardous characteristics of the waste. Preferred descriptions are: Corrosive, Reactive, Ignitable, and EP toxic (for heavy metals such as lead, mercury, silver, etc.). Other identifies can be: Dioxins, Listed Spent Solvents (i.e. acetone, trichloroethylene, methylene chloride, etc.), and Listed Chemical Products (provide actual chemical name, such as formic acid, lead acetate, etc.). For information on how to identify hazardous wastes, or how to identify the hazardous characteristics of RCRA materials, refer to 40 CFR, Page 261, Subparts A,B,C, and D. Questions concerning this entry should be directed to your supervisor or Generator Certification Official.

7. EPA Waste Number - If the material is a hazardous waste, as defined by RCRA regulations, then an EPA waste number must be provided. Lists of hazardous wastes and their associated EPA waste numbers can be found in 40 CFR, Part 261, Subpart D. If the waste is not listed in Subpart D, but it exhibits one of the RCRA defined characteristics of a hazardous waste, the waste will be given the following EPA numbers corresponding to the hazardous characteristic:

Characteristic	EPA Number
Ignitable	D001
Corrosive	D002
Reactive	D003
EP Toxic	See Table 1, Subpart C

Questions concerning this entry should be directed to your supervisor or GCO.

8. Signature - Signature of the person placing the packet or bagged article in the waste container (INITIALS ARE NOT ACCEPTABLE). This signature certifies that the person has successfully completed training course on "Proper Packaging of Transuranic Waste", that the waste has been packaged in accordance with the standard operating procedure for packaging TRU waste for that facility, and that the waste packet or bagged article placed in the drum contains no free liquids, compressed gas cylinders or other nonconformance item specified in ORNL/TM-10322.

9. Data Log Sheet Verification - Verification must be made, on a routine basis, that the data log sheet is being used properly. For TRU waste, this check can be made by the QAR, GCO, or HP representative for the area. The date of the check and the signature of the person making the check must be entered in the appropriate columns (INITIALS ARE NOT ACCEPTABLE). (The person making the verification must have passed the training course on "Proper Packaging of Transuranic Waste").

SIGNATURE AT THE BOTTOM OF THE PAGE (When multiple pages are involved, this signature is required on the last page only)

Generator Certification Official - This signature certifies that the GCO has confirmed that all personnel placing waste in the referenced container have been properly trained to package transuranic waste, that the correct forms have been completed and, to the best of his knowledge, that the waste container has been properly packaged in accordance with applicable storage and disposal requirements defined in ORNL/TM-10322.

LOG-IN DATA SHEET FOR GENERATORS OF RADIOACTIVE SOLID LOW-LEVEL WASTE

LLW CONTAINER CODE NUMBER

UCN-2822 DOC. NO.

Pkt. No.	Date	Weight Lbs.	Pkt. Origin Bldg. / Room No.	Dose Rate mRem/hr.	Isotope Ci or Gms	Isotope Ci or Gms	Isotope Ci or Gms	Isotope Ci or Gms	Isotope Ci or Gms	Isotope Ci or Gms	Physical Desc. (Glass, Paper, Etc.)	Chemical Form	RCRA (Yes/No)	Generator's Signature	Badge No.

1. Drum closure: If waste is packaged in a 55-Gal drum, the gasket has been put in place and the closure ring bolt tightened to 45 ft-lbs. SIGNATURE (Signature of individual who tightened closure ring)

2. Are TRU wastes generated in the areas of waste generation listed on these forms? ☐ YES ☐ NO SIGNATURE (GCO Sign)

3. GCO Signature - Certifies that the waste was packaged in accordance with the Waste Acceptance Criteria, ORNL SLLW Certification Program Plan, and SLLW QA Plan requirements. (GCO must be MMES employee) BADGE NO. SIGNATURE

RADIOACTIVE SOLID WASTE OPERATIONS

RSWO AUTHORIZED SIGNATURE BADGE NO. DATE

DISTRIBUTION: WHITE - SWSA FOREMAN FORWARDS TO DMC
BLUE - RETAINED BY SWSA FOREMAN
CANARY - RETAINED BY GENERATOR

UCN-16114 (3 3-93)

GENERATOR INSTRUCTIONS FOR FILLING OUT THE "LOG-IN DATA SHEET FOR GENERATORS OF SLLW"

LLW No. Enter the bar-coded number affixed to the container (box, drum, other).

Column 1 **PACKET NUMBER:** Enter packet number. The first packet placed in each container should be labeled number one and each subsequent packet labeled and numbered sequentially thereafter. Each article placed in the container (box, drum, other) must be bagged or sealed.

Column 2 **DATE:** Enter the date that each packet is placed in the container.

Column 3 **WEIGHT (LBS):** Estimate (within 10% accuracy) the weight of the packet in pounds.

Column 4 **PKT. ORIGIN BLDG./ROOM NO.:** Enter the building, room number, or other information which identifies the location from which the waste originated.

Column 5 **DOSE RATE MREM/H:** Monitor each packet for alpha, beta and/or gamma radiation using a survey instrument per RP requirements and enter the result. If appropriate, monitor for neutrons using a BF_3 counter, fast neutron survey meter, or a comparable instrument and enter the result.

Column 6-11 **ISOTOPES:** ***List only 1 isotope per column.*** List all radionuclides present in packet that account for 5% of activity, starting with the dominant radionuclides first. Include radionuclides that process knowledge indicates are present but are undetectable at the detection limit of the analysis instrument.

CURIES OR GRAMS: Use the procedure identified in your waste management plan for estimating curies. Report in curies or grams as appropriate. Report fissile materials in grams.

Column 12 **PHYSICAL DESCRIPTION:** Describe the physical form of the contaminated material (plastic, paper, glass, metal, soil, wood, rubber, cloth, etc.).

Column 13 **CHEMICAL FORM** (radionuclide): Describe the chemical form of the isotopes. Acceptable entries for chemical form include: oxide, chloride, nitrate, metal oxide, elemental, inorganic salt, general chemical description, etc.

Column 14 **RCRA (YES/NO):** Enter either YES or NO if waste packet contains RCRA regulated materials.

Column 15 **GENERATOR'S SIGNATURE:** The person placing each sealed or bagged article in the container certifies that the waste was packaged in accordance with the Waste Acceptance Criteria, SLLW QA Plan, and the ORNL Certification Program Plan (initials are NOT acceptable). This person must be current in Waste Generator Training for SLLW (TMIS# 1365).

Column 16 **BADGE NO.:** Enter badge number of person signing in column 15.

RSWOG PERSONNEL INSTRUCTIONS FOR CHECKING AND COMPLETING THE "LOG-IN DATA SHEET FOR GENERATORS OF SLLW"

1. Check to see that a LLW No. and UCN-2822 Doc. No. are entered and that Columns 1 through 16 and Notes 1 through 3 are filled out completely and legibly.

2. The RSWO representative must sign at the bottom of the page prior to waste transfer to the SWSA.

LOG-IN DATA SHEET FOR GENERATORS OF RADIOACTIVE SOLID LOW-LEVEL WASTE (CONTINUATION)

Page ___ of ___

LLW CONTAINER BAR CODE NUMBER

UCN-2632 DOC. NO.

Pkt. No.	Date	Weight Lbs.	Pkt. Origin Bldg. / Room No.	Dose Rate mRem/hr.	Isotope Ci or Gms	Isotope Ci or Gms	Isotope Ci or Gms	Isotope Ci or Gms	Isotope Ci or Gms	Isotope Ci or Gms	Physical Desc. (Glass, Paper, Etc.)	Chemical Form	RCRA (Yes/No)	Generator's Signature	Badge

RADIOACTIVE SOLID WASTE OPERATIONS

RSWO AUTHORIZED SIGNATURE | BADGE NO. | DATE

DISTRIBUTION: WHITE - SWSA FOREMAN FORWARDS TO DMC
BLUE - RETAINED BY SWSA FOREMAN
CANARY - RETAINED BY GENERATOR

UCN-16114A (3 3-93)

GENERATOR INSTRUCTIONS FOR FILLING OUT THE "LOG-IN DATA SHEET FOR GENERATORS OF SLLW"

LLW No. Enter the bar-coded number affixed to the container (box, drum, other).

Column 1 **PACKET NUMBER:** Enter packet number. The first packet placed in each container should be labeled number one and each subsequent packet labeled and numbered sequentially thereafter. Each article placed in the container (box, drum, other) must be bagged or sealed.

Column 2 **DATE:** Enter the date that each packet is placed in the container.

Column 3 **WEIGHT (LBS):** Estimate (within 10% accuracy) the weight of the packet in pounds.

Column 4 **PKT. ORIGIN BLDG./ROOM NO.:** Enter the building, room number, or other information which identifies the location from which the waste originated.

Column 5 **DOSE RATE MREM/H:** Monitor each packet for alpha, beta and/or gamma radiation using a survey instrument per RP requirements and enter the result. If appropriate, monitor for neutrons using a BF_3 counter, fast neutron survey meter, or a comparable instrument and enter the result.

Column 6-11 **ISOTOPES:** ***List only 1 isotope per column.*** List all radionuclides present in packet that account for 5% of activity, starting with the dominant radionuclides first. Include radionuclides that process knowledge indicates are present but are undetectable at the detection limit of the analysis instrument.

CURIES OR GRAMS: Use the procedure identified in your waste management plan for estimating curies. Report in curies or grams as appropriate. Report fissile materials in grams.

Column 12 **PHYSICAL DESCRIPTION:** Describe the physical form of the contaminated material (plastic, paper, glass, metal, soil, wood, rubber, cloth, etc.).

Column 13 **CHEMICAL FORM** (radionuclide): Describe the chemical form of the isotopes. Acceptable entries for chemical form include: oxide, chloride, nitrate, metal oxide, elemental, inorganic salt, general chemical description, etc.

Column 14 **RCRA (YES/NO):** Enter either **YES** or **NO** if waste packet contains RCRA regulated materials.

Column 15 **GENERATOR'S SIGNATURE:** The person placing each sealed or bagged article in the container certifies that the waste was packaged in accordance with the Waste Acceptance Criteria, SLLW QA Plan, and the ORNL Certification Program Plan (initials are NOT acceptable). This person must be current in Waste Generator Training for SLLW (TMIS# 1365).

Column 16 **BADGE NO.:** Enter badge number of person signing in column 15.

RSWOG PERSONNEL INSTRUCTIONS FOR CHECKING AND COMPLETING THE "LOG-IN DATA SHEET FOR GENERATORS OF SLLW"

1. Check to see that a LLW No. and UCN-2822 Doc. No. are entered and that Columns 1 through 16 and Notes 1 through 3 are filled out completely and legibly.

2. The RSWO representative must sign at the bottom of the page prior to waste transfer to the SWSA.

NONCONFORMANCE REPORT (NCR)

MARTIN MARIETTA

Sheet _____ of _____

1. ☐ SUPPLIER ☐ INTERNAL

This form should be completed when one or more distinct, describable, and measurable properties or characteristics of an item (hardware or software) do not conform to documented technical requirements.

2. NONCONFORMANCE REPORT NO. NCR-

3. IDENTIFICATION DATE	4. ORIGINATOR	5. RESPONSIBLE PERSON	6. PLANT	7. DIVISION	8. ADDRESS	9. PHONE

10. PROJECT TITLE/JOB NUMBER	11. PART/ITEM NAME	12. FACILITY/SHOP/ORG./AE/SUPPLIER

13. PUR.ORDER/WO/CONTRACT/STORES	14. ITEM NO.	15. R/R NO.	16. DWG./SPEC.	17. REV.	18. QTY. RECVD.	19. QTY. INSP.	20. QTY. REJ.

21. DESCRIPTION

21A. SPECIFIED REQUIREMENTS	21B. NONCONFORMANCES

22A. EVALUATION, REMEDIAL ACTION AND TECHNICAL JUSTIFICATION

22B. NONCONFORMANCE DISPOSITION ☐ ACCEPT-USE-AS-IS ☐ REWORK TO SPEC. ☐ REPAIR TO USABLE COND. ☐ RETURN TO SU ER/SHOP ☐ REJECT/SCRAP

23. DISPOSITION APPROVAL/CONCURRENCE

23A. DISPOSITIONING AUTHORITY	23B. DATE	23C. CUSTOMER/USER CONCURRENCE	23D. DATE	23E. QA SPECIALIST CONCURRENCE	23F. DATE

24. ESTIMATED TOTAL COST	25. RATIONALE FOR COST ESTIMATE

26. CORRECTIVE ACTION PLAN REQUIRED: ☐ YES ☐ NO	27. HOLD TAG NUMBER OR SEGREGATION AREA IDENT.

UCN-11457 (12356 7-93)

NOTE: HIGHLIGHTED AREAS INDICATE DATA BASE ENTRIES

NONCONFORMANCE REPORT FORM INSTRUCTIONS (NCR KEY)

The NCR Form shall be completed by line management, or the line manager's designee, after receipt and review of the applicable nonconforming documentation. The form allows for describing requirement(s), nonconforming condition(s), and disposition. The completed form also provides data for input into ESAMS.

*1. **FORM USAGE** - Supplier: applies to new items from external/internal supplies. Internal: not related to suppliers.

*2. **NCR NUMBER** - After it is determined that a nonconformance exists, the NCR number is generated by ESAMS upon entry of the initial NCR information into ESAMS. The user has the option to define an additional identifier if it is desired. (Action Item ID, Action Item Reference ID)

*3. **IDENTIFICATION DATE** - Date the nonconformance is identified. (Action Item Identification Date)

*4. **ORIGINATOR** - Name/badge of the individual originating (initiating) the NCR form.

5. **RESPONSIBLE PERSON** - Name/badge of the individual responsible for ensuring analysis and dispositions of the NCR. (Action Item Responsible Person)

*6. **PLANT** - Name of the originating plant, e.g., Y-12, K-25, X-10, CENTR. (Action Item Site)

*7. **DIVISION** - Name/division number of the division responsible for the NCR.

8. **ADDRESS** - Address of the originator. (Automatically included on output forms by ESAMS)

9. **PHONE NUMBER** - Telephone number of the originator. (Automatically included on output forms by ESAMS)

*10. **PROJECT TITLE/JOB ORDER/PROJECT NUMBER** - Project title or job number as reflected on drawings, specifications, or other documentation. (Action Item Title)

11. **PART/ITEM NAME** - Part or item as reflected on drawings, specifications, or other documentation.

*12. **NAME OF FACILITY/SHOP/ORGANIZATION/AE** - Name of specific supplier (item/software manufacturer), shop, Energy Systems organization, contractor, architect engineer (AE), etc., supplying the nonconforming item/software. (ESAMS will NOT contain a current listing of "names." (Action Item Contractor)

13. **PURCHASE ORDER/WORK ORDER OR CONTRACT/STORES NUMBER - Applicable purchase order, work order, contract number, or stores number for the item/software procured, produced, or fabricated.

14. **ITEM NUMBER - Purchase order item number applicable to the nonconforming item, software, or service.

15. **RECEIVING REPORT NUMBER - Receiving report number(s) applicable to the receipt of the nonconforming item(s).

16. **DRAWING/SPECIFICATION/DOCUMENT NUMBER - Indicate the drawing or specification number for the procured, purchased, or fabricated item/software, if applicable.

17. **REVISION NUMBER - Record the revision number of the applicable document indicated in Number 16 above.

18. **QUANTITY RECEIVED OR PRODUCED - Total number of items/batches/lots received, produced, or fabricated, including nonconforming items for this receipt or this submission to inspection.

*19. **QUANTITY INSPECTED** - Number of parts inspected or tested on this receipt of items.

20. **QUANTITY NONCONFORMING - Total number of nonconforming items for this receipt or submission, or purchase order.

21. **DESCRIPTION** - Concise, complete description of the nonconformance(s).

*21A. **SPECIFIED REQUIREMENTS** - Identify the requirement(s) from the applicabe drawings, specification(s), or purchase order.

21B. **NONCONFORMANCE** - Identify the nonconforming condition(s) as reported on the inspection or test data report.

22A. **EVALUATION, REMEDIAL ACTION AND TECHNICAL JUSTIFICATION** - State the justification for the disposition selected and the specific action(s) to be taken to make the item/software usable. Also, include technical justification for acceptability of "use-as-is" or "repair" criteria. Identify the individuals responsible for developing, reviewing, and approving any remedial action plans.

*22B. **NONCONFORMANCE DISPOSITION** - Indicate the item/software nonconformance(s) disposition as either accept-as-is, rework, repair, return, or reject/scrap.

23. **DISPOSITION APPROVAL AND CONCURRENCE** - Signatures of the dispositioning authority and other individuals concerning the decision.

*23A. **DISPOSITIONING AUTHORITY** - Signature of the dispositioning authority determining the disposition decision for the nonconforming parts.

*23B. **DATE** - Dispositioning authority approval date also indicates the NCR Form closure date.

23C. **DISPOSITION CONCURRENCE** - Signature of the customer/user indicating concurrence with the disposition of the nonconforming parts.

23D. **DATE** - Date of customer/user concurrence.

23E. **DISPOSITION CONCURRENCE** - Signature of the assigned Quality Assurance Specialist indicating concurrence with the disposition of the nonconforming parts.

23F. **DATE** - Date of Quality Assurance Specialist concurrence.

24. **ESTIMATED TOTAL COST** - Estimated or actual cost impact of the nonconformance.

25 **RATIONALE FOR COST ESTIMATE** - Brief explanation of rationale for determining total cost estimate.

*26. **CORRECTIVE ACTION PLAN REQUIRED** - Indicate if corrective action plan is required.

27. **HOLD TAG NUMBER OR SEGREGATION AREA INDENT. - Write in appropriate data, if required.

NOTE: These instructions are guidelines to assist in the understanding and standardization of the NCR Form. Individual organizations may further explain, clarify, and refine these instructions as they see fit, provided these basic guidelines are not contravened. Where any space on the form is too small, continuation on a supplemental sheet is encouraged.

(*) Indicates an ESAMS data base entry. (**) This information should be included in the Description Field when entry is made in ESAMS

PROCESS KNOWLEDGE (PK) DOCUMENTATION
UCN-20116

Instructions:
Process knowledge (PK) is documented knowledge of the source, constituents, and processes associated with a waste that allows a reliable estimation of the components and component amount in waste from a specific waste stream. PK can be an effective tool for characterization of wastes in those cases where other methods, such as sampling and analysis, nondestructive assay, etc. are neither feasible nor cost effective. When using PK to characterize waste, UCN-20116 shall be thoroughly completed. The following are some examples of the types and sources of information that may be used to support the use of PK:

Sampling and analysis results of the process, Procurement specifications, Vendor data (including hazardous materials analytical results), Material balance and concentration calculations, Analytical results from similar processes, Results from laboratory or pilot plant studies (e.g., treatability studies) and Administrative/procedural controls.

[NOTE: Direct any questions on completion, submittal or use of this form to the Site Waste Certification Group (WCG).]
1) Complete all sections of this form (UCN-20116) to document PK and sign. Complete one UCN-20116 form for **EACH** separate waste category (i.e., complete one for LLW, one for RCRA/TSCA, etc.).
2) Enter "N/A" in sections of this form that are not applicable.
3) If not enough space is available on the UCN-20116 form, attach separate pages as needed.
4) Submit all completed UCN-20116 forms to ESWMO.

UCN-2109 or WCP No.: _____ Date _____

Section A: PROCESS AREA INFORMATION

1) Building/Area _____ Room No._____
Name/Title of person completing this form _____

2) Describe (*in detail*) the process/activity conducted in this area _____

3) Which of the following waste categories are generated in this process/activity area?

LLW__ RCRA/TSCA__ RCRA/TSCA MIXED__ TRU/TRU MIXED__ LIQUID (K-25)__ LIQUID (Y-12)__ LIQUID (ORNL)__

Section B: WASTE CATEGORY AND WASTE STREAM INFORMATION

1) For which waste category is the process knowledge documented herein to be used (check only ONE per form):

LLW__ RCRA/TSCA__ RCRA/TSCA MIXED__ TRU/TRU MIXED__ LIQUID (K-25)__ LIQUID (Y-12)__ LIQUID (ORNL)__

2) Provide a brief description of the waste stream(s) within the category identified in B.1 for which this process knowledge applies _____

Section C: RADIOACTIVE CONSTITUENTS

1) If PK is used to demonstrate the **ABSENCE** of radioactive constituents, then list all documents, procedures, reports, and supporting evidence which justifies the use of PK _____

methodologies used to make these determinations. In addition, list all documents, procedures, reports and supporting evidence which justifies the use of PK _____

Section D: REGULATED (RCRA/TSCA) HAZARDOUS CONSTITUENTS

1) If PK is used to demonstrate the **ABSENCE** of RCRA/TSCA constituents, then list all documents, procedures, reports, and supporting evidence which justifies the use of PK _____

2) If PK is used to demonstrate the **PRESENCE** of or to **QUANTIFY** RCRA/TSCA constituents or determine EPA Waste Codes, describe the methodologies used to make these determinations. In addition, list all documents, procedures, reports and supporting evidence which justifies the use of PK _____

Section E: OTHER WAC PARAMETER DETERMINATION

1) Describe the method used to demonstrate the **PRESENCE** or **ABSENCE** of, or to **QUANTIFY**, other WAC parameters. In addition, list all documents, procedures, reports and supporting evidence which justifies the use of PK _____

Completed by: (Print Name, Sign) _____ Badge Number _____ Date _____

WASTE CERTIFICATION STATEMENT
UCN-20117

This certification statement applies to UCN-2109 number _____.

I certify that I have been provided sufficient information concerning the above-described waste to apply the requirements of EP-710, Oak Ridge Reservation Waste Certification Requirements, and ES/WM-10, Waste Acceptance Criteria for the Oak Ridge Reservation, and, based on this information, I further certify that this waste material:

1. Is accurately described on the UCN-2109; and

2. Has been properly described and packaged in accordance with Waste Certification Procedure _____; and

3. Meets the Waste Acceptance Criteria for this waste, as listed in ES/WM-10, for the waste category checked below:

   - ☐ Low-Level Waste
   - ☐ Transuranic and Transuranic Mixed Waste
   - ☐ RCRA- and/or TSCA-Regulated Waste
   - ☐ RCRA- and/or TSCA-Regulated Mixed Waste
   - ☐ Liquid Wastes to be Treated at the K-25 Site
   - ☐ Liquid Wastes to be Treated at ORNL
   - ☐ Liquid Wastes to be Treated at the Y-12 Plant
   - ☐ Liquid Wastes to be Placed in Bulking Tanks at the K-25 Site

4. Or, if applicable, meets the conditions stipulated in variance number _____.

I further certify that all required documentation is attached to the UCN-2109 and that, to the best of my knowledge and belief, the information on the UCN-2109 is complete and accurate.

I currently am authorized to perform Waste Certifier functions in accordance with the requirements of EP-710.

WASTE CERTIFIER			
PRINTED NAME	SIGNATURE	BADGE NUMBER	DATE

Appendix C

Criteria for Use of ORNL ER Program Well Drilling Steam Cleaning Area

MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2008
OAK RIDGE, TENNESSEE 37831

March 3, 1993

Distribution:

Criteria for Use of Oak Ridge National Laboratory Environmental Restoration Program Well Drilling Steam Cleaning Area

The Well Drilling Steam Cleaning Area (WDSCA), located in Melton Valley south of the main plant at Oak Ridge National Laboratory (ORNL) via a gravel driveway off Melton Valley Drive is managed by ORNL Environmental Restoration (ER) Program. The WDSCA has been designated for cleaning non contaminated (radiological/chemical) well drilling and excavating equipment.

Specific sections of divisions and subcontractors performing tasks for ORNL ER Program will be allowed to use the WDSCA by following the criteria set forth below:

I. Access Approval:

All users of the WDSCA must obtain approval from the ORNL ER Program manager or his designee. All users must fully abide by the criteria set forth in this document and abide by all other environmental laws in the protection of the environment and personnel safety while working within the WDSCA.

Users are to have as part of their decontamination procedures or the hazard analysis section of their ES&H plan a section on specific protocol centered around environmental and personnel safety while working within the WDSCA.

II. Prohibited Equipment:

Cleaning of equipment with the following characteristics is not allowed at the WDSCA:

A. Equipment that does not meet ORNL Health Physics Department green tag (clean) limits for radiological contaminated equipment:

1. Transferable: $\leq$ 20dpm/100 cm^2 Alpha and $\leq$ 200 dpm/100 cm^2 beta-gamma

2. Direct measurement: $\leq$ 300 dpm/100 cm^2 Alpha and $\leq$ 1000 dpm/100 cm^2 beta-gamma

3. Equipment suspected of having any chemical or petroleum contamination.

4. Equipment used in excavation, drilling or sampling operations where the environmental medial (such as soil) measures $\geq$ 1 ppm on the Organic Vapor Analyzer or the HNu photoionization detector.

5. Equipment with excess amounts of mud, and soil must be removed from all equipment before the equipment is delivered to the WDSCA.

III. Responsibilities of Facility Users:

Users of the WDSCA will be responsible for the following:

A. Enter and exit the area (WDSCA) through the card reader gate located at the main entrance of SWSA 5.

B. Assure that the gate south of the WDSCA is closed and locked.

C. Assure that all personnel have been trained properly in the proper use of the steam cleaning equipment.

D. Assure that all personnel are aware of the hazards and the safety precautions needed to perform their task safely.

E. Assure that all personnel are aware of the criteria for bringing equipment into the WDSCA.

F. Assure that all equipment meets the acceptance criteria for cleaning at the WDSCA.

G. Responsible for maintaining good house keeping practices. Any equipment, materials, or trash generated at the site shall be kept orderly and/or placed in proper containers.

H. Assure that geotextile fabric is placed over the ground surface where steam cleaning activities occur.

I. Assure that all trash and debri placed in the clean dumpster has been checked for radioactivity.

J. Notify ORNL ER Program representative when unsound environmental practices are noted.

K. Notify ORNL ER Program representative when unauthorized personnel are noted using the WDSCA.

L. Assist in any dredging, pumping, and sampling activity in maintaining the operation of the basins.

M. Facilitate arrangements for water removal from basins when basin reach 85% fullness.

IV. Water/Sediment Removal From Basins:

The water in the basins may be removed by pumping the water through the overflow pipe which will discharge the water onto the hillside west of the basins. However, before the water is pumped out onto the hillside, the following analysis must be performed in order to assure we are not insulting the environment:

Radionuclides	Specific Radionuclides Only If
Gross alpha	Gross alpha > 1 Bq/L
Gross beta	Gross Beta > 9 Bq/L

Chemical

Total organics, ICP metals, Hg

If the chemical analysis verify the presence of the above chemicals then a TCLP analysis may need to be requested. Confirm with Environmental Compliance (Charlie Valentine).

Water may also be removed from the basins by pumping the water directly into a tanker which will transport the water to the ORNL Process Waste System. Based on process knowledge of no contaminated equipment being clean at the WDSCA, no radiological or chemical analysis is required for the waste to be sent to the Process Waste System.

Arrangements are to be put in place to remove the sediment in basin #3 (containment box basin) when it reaches 85% capacity. The sediment is to be transferred to ORNL Waste operations or the facility manager for disposal or use as fill material.

V. Responsibility of ORNL ER Program

1. Assure that all assigned users of the WDSCA understand the criteria set forth in using the WDSCA.
2. Assure that all assigned users are adhering to the criteria for using the WDSCA.
3. Assist in the interphase of having samples taken from the basins.
4. Assist in the interphase of having water and sediment removed from the basins.
5. Maintain all copies of analytical data received on the basins.
6. Assure that ORNL Waste Management and ORNL Compliance receives copies of analytical data received on the basins.

DISTRIBUTION

1. T. B. Allen
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