# APPENDIX 5.2-1

# WASTE ACCEPTANCE PLAN

# WASTE ACCEPTANCE PLAN

# FOR

# LOW-LEVEL RADIOACTIVE WASTE LAND DISPOSAL FACILITIES

# WASTE CONTROL SPECIALISTS LLC

# ANDREWS, TEXAS FACILITY

# 9998 WEST HIGHWAY 176

# ANDREWS, TX 79714

Regulated Entity Number: RN101702439

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# Acronyms and Abbreviations

| | |
|---|---|
| AASHTO | American Association of State Highway and Transportation Officials |
| ALARA | As Low As Reasonably Achievable |
| ASTM | American Society for Testing and Materials |
| BS | Bulk Soil/Soil-Like |
| BTP | Branch Technical Position |
| CD | Containerized Debris |
| CFR | Code of Federal Regulations |
| CS | Containerized Soil-Like |
| CWF | Compact Waste Facility |
| DOE | Department of Energy |
| DOT | Department of Transportation |
| EPA | Environmental Protection Agency |
| FWF | Federal Waste Facility |
| FWF-CDU | FWF Containerized Disposal Unit |
| FWF-NCDU | FWF Non-Containerized Disposal Unit |
| HCD | High Container Dose |
| LC | Large Component |
| LDR | Land Disposal Restrictions |
| LLRW | Low-Level Radioactive Waste |
| LLMW | Low-Level Mixed Waste |
| MCC | Modular Concrete Canister |
| NRC | Nuclear Regulatory Commission |
| PFLT | Paint Filter Liquids Test |
| PPE | Personal Protective Equipment |
| QA/QC | Quality Assurance/Quality Control |
| RCRA | Resource Conservation and Recovery Act |
| RML | Radioactive Materials License |
| RSO | Radiation Safety Officer |
| RST | Radiation Safety Technician |
| RWP | Radiation Work Permit |
| SCO | Surface Contaminated Object |
| SOPs | Standard Operating Procedures |
| TAC | Texas Administration Code |
| TCEQ | Texas Commission on Environmental Quality |
| TCLP | Toxic Characteristic Leaching Procedure |
| WAP | Waste Acceptance Plan |
| WAS | Waste Acceptance Specialist |
| WCS | Waste Control Specialists LLC |
| WPF | Waste Profile Form |

# 1.0 INTRODUCTION

Waste Control Specialists, LLC (WCS) is authorized by the Texas Commission on Environmental Quality (TCEQ) to operate a near-surface land disposal facility for Low-Level Radioactive Waste (LLRW) and Low-Level Mixed Waste (LLMW) in accordance with TCEQ Radioactive Materials License (RML) R04100 and Hazardous Waste Permit 50397 at the WCS Andrews Facility located at 9998 West Highway 176, Andrews, Texas 79714. LLRW is waste that meets the definition of "low-level radioactive waste" in the Texas Administration Code (TAC), 30 TAC 336.2(76) excluding LLMW. LLMW is waste that is a combination of both Resource Conservation and Recovery Act (RCRA) hazardous waste and LLRW, consistent with the definition of "mixed waste" in 30 TAC 336.2(80). This Waste Acceptance Plan (WAP) presents the approach employed by WCS for obtaining, reviewing and verifying waste information so that LLRW and LLMW are managed safely and in compliance with applicable regulations and license conditions. LLRW and LLMW are classified by Federal and State low-level waste regulations as Class A, Class B or Class C based on the activity and half-lives of various radionuclides.

This plan applies to Compact Waste and Federal Facility Waste intended for disposal in the Compact Waste Facility (CWF) and Federal Waste Facility (FWF) as defined in Texas Health and Safety Code 401.2005. Separate disposal units for Compact and Federal waste are constructed, operated and closed consistent with TCEQ requirements. Each disposal facility has a separate entrance gate and perimeter control fencing. Waste will not be accepted into the FWF until WCS has begun accepting waste in compliance with RML R04100 at the CWF.

The Compact Waste Facility (CWF) accepts commercial LLRW in accordance with Texas Low-Level Radioactive Waste Disposal Compact Commission (typically referred to as the Texas Compact Commission) rules and regulations. The Texas Compact Commission roles and responsibilities applicable to this document are associated with importation of out-of-compact waste. WCS is required to ensure all waste received from an out-of-compact generator is imported under a proper importation agreement in accordance with the Texas Compact Commission rules and regulations.

The CWF is authorized to receive Class A, Class B and Class C waste. The Federal Waste Facility (FWF) accepts Federal Waste, as defined in Section 2.0 of this document, that is both LLRW and LLMW and consists of two separate units: the FWF Containerized Disposal Unit (FWF-CDU) and the FWF Non-Containerized Disposal Unit (FWF-NCDU). The FWF-CDU is authorized to receive Class A, Class B and Class C waste; and the FWF-NCDU is authorized to receive Bulk Soil/Soil Like Waste as defined in this document. The FWF and CWF are collectively referred to as the "LLRW disposal facilities."

With the exception of large components (LCs), Containerized Waste as defined in Section 2.0 of this document will be placed inside cylindrical or rectangular canisters within the CWF and FWF-CDU. Each canister will be filled with a flowable concrete grout to eliminate internal void spaces, and void spaces between the canisters will be back filled with granular material to eliminate void spaces. Large components that will not fit into concrete canisters will be grouted in place during final disposal at the CWF or FWF-CDU. Bulk Soil/Soil Like Waste is authorized for disposal in the FWF-NCDU. Bulk Soil/Soil Like Waste and Bulk Debris as defined in this

document is authorized for disposal within the areas defined as the In-Cell Non-Canister Disposal Unit (IC NCDU) within the FWF-CDU and the CWF. The definition of Containerized Waste is presented in the Section 2.0 of this WAP. Bulk Soil/Soil Like Waste and Bulk Debris are described within this document in Sections 4.1 and 4.2 respectively.

This WAP, in conjunction with Standard Operating Procedures (SOPs), establishes the steps by which WCS:

- obtains and verifies waste information prior to approving waste for shipment and disposal;
- confirms the suitability of each waste shipment before it is released by the generator for transport to WCS; and
- evaluates each shipment of waste arriving at the facilities for conformance with regulatory and operational acceptance criteria for the designated disposal unit.

Implementation of this WAP and SOPs ensure that sufficient information is known for each candidate waste to:

- determine waste acceptability for disposal in accordance with applicable State and Federal regulations and operational constraints associated with each disposal unit;
- identify safe handling procedures that maintain worker radiological exposures to As Low As Reasonably Achievable (ALARA) criteria; and
- ensure that each disposal unit receives only those wastes that are authorized to be disposed in that unit in accordance with RML R04100.

Wastes that do not meet regulatory, license and LLRW disposal facility requirements will not be accepted for disposal by WCS. Generators who ship wastes to the LLRW disposal facilities that do not meet regulatory requirements will be barred from shipping additional wastes to WCS for disposal until they have been reinstated in accordance with this WAP.

The balance of this WAP is organized in the following manner:

- **Section 2** – defines terms used in this WAP.
- **Section 3 –** delineates the characteristic and form requirements of wastes intended for the LLRW disposal facilities. This includes radiological parameters, physical and chemical characteristics, stability requirements and safety considerations.
- **Section 4** – describes the wastes that will be sampled upon receipt to verify compliance with this WAP and State and Federal rules and regulations. Waste categories were selected based upon the ability to obtain representative waste samples, ALARA considerations and other personnel protection concerns.
- **Section 5** – describes the generator certification and waste profile approval process.
- **Section 6** – delineates waste receipt; including the pre-shipment review, shipment inspections, waste inspections and waste sampling scenarios.
- **Section 7** – describes the process for resolving discrepancies.

Any variances from this WAP may require an application for amendment to Radioactive Material License No. R04100. Variances, revisions or changes from this WAP will be evaluated by the Texas Commission on Environmental Quality (TCEQ) on a case-by-case basis for making license amendment determination. The executive director may accept, on a case-by-case basis,

revisions to WAP provisions which do not affect human health and the environment, provided written notification to the executive director is made by the Licensee as soon as practicable.

# 2.0 DEFINITIONS

Compact Waste- LLRW that is generated in a host state or party state or LLRW that is not generated in a host state or party state, but has been approved for importation to the state by the Texas Compact Commission

Containerized Class A waste – Defined by 30 TAC 336.702 as Class A low-level radioactive waste that presents a hazard because of high radiation levels. High radiation levels are radiation levels from an unshielded container that could result in an individual receiving a dose equivalent in excess of 100 mrem (1 milliSievert) in one hour at 30 centimeters from any surface of the container that the radiation penetrates.

Containerized Waste – Excluding LCs, waste which is required to be placed inside a Modular Concrete Canister (MCC) at the time of disposal and includes the following:

- Containerized Class A waste;
- Class A waste that does not meet the stability requirements described in WAP Section 4.1;
- Depleted Uranium;
- Class A waste with a dose rate greater than 100 mrem/hr at 30 cm Class B waste; and
- Class C waste.

Debris – Waste debris consisting of the following material:

- Solid material exceeding a 60 millimeter (2.4 inch) particle size that is intended for disposal and that is a manufactured object; plant or animal matter; or natural geologic material (e.g., Rubble as defined in this Section, lead bricks and shielding, wood, concrete, metal, personal protective equipment (PPE), lab wastes, and trash), consistent with the RCRA definition that is applicable to LLMW.
- *Monoliths* – A mass constituting a single undifferentiated rigid unit (e.g. concrete-like unit generated from stabilization or in-situ grouting of waste, or single uniform piece of debris).
- Large Items such as oversized containers, motors, components, etc that meet the criteria for disposal within an IC NCDU.

Federal Waste- LLRW and LLMW that is the responsibility of the Federal government under the LLRW Policy Act as amended by the LLRW Policy Amendments Act of 1985 (DOE waste, US Navy vessel decommissioning waste, government atomic weapons research and development, testing, or production, excluding Greater than Class C waste)

Free liquids – Liquids that readily separate from a solid waste matrix under ambient temperature and pressure as quantitatively determined using the Paint Filter Liquids Test (PFLT),

Environmental Protection Agency (EPA) Method 9095 (most current version), consistent with the definition applicable to hazardous waste.

Free-standing liquids – Liquids that are present as a separate layer on the surface of a waste.

In-Cell Non-Containerized Disposal Unit (IC NCDU): An area, as defined in the license application that has been designated for disposal of Bulk Soil/Soil Like waste and Bulk Debris.

Intrusive inspection – Opening waste packages or the shipping container to visually observe the actual waste material.

Intrusive sampling – Collection of physical samples of the incoming waste materials in appropriate sample containers for laboratory analyses.

Large Component (LC) – equipment and large items that will not fit into standard Modular Concrete Canisters (MCCs); items that, for other considerations, will not be placed in an MCC; and other waste for which disposal within an MCC may not be desirable. Items that will be disposed in a debris lift of the IC NCDU, and would otherwise fall under this definition will not be considered a Large Component for purposes of this document.

Low-Level Mixed Waste (LLMW) – Waste that is a combination of both RCRA hazardous waste and LLRW, consistent with the definition of "mixed waste" in 30 TAC 336.2(80)

Low-Level Radioactive Waste (LLRW) – All waste that meets the definition of "low-level radioactive waste" in 30 TAC 336.2(76) other than LLMW.

Modular Concrete Canister (MCC) – Cylindrical or rectangular reinforced concrete canister that when properly filled with waste and grout meets the stability requirements found in 30 TAC 336.362(b)(2) and conforms to the TCEQ regulatory requirements of retrievability.

Monoliths – Defined under debris.

Rubble – Inert construction and demolition waste composed of solid pieces of concrete and concrete products, reinforcing steel, asphalt pavement, brick, and/or rock and possibly including some soil; and larger, irregular structural items (e.g., piping, valves, structural shapes, metal ductwork and similar materials).

Soil/Soil-like Waste – Class A wastes streams composed predominantly of soil and soil-like materials that meet the requirements noted in Section 4.1.

Solidification by absorption – A process that involves physical absorption, where the liquid is drawn into the pores of a permeable solid, but does not include chemical binding processes. Solidification by absorption is typically termed "absorption" in the regulations and guidance applicable to low-level radioactive waste and "solidification" in the regulations and guidance applicable to hazardous waste.

Solidification by stabilization – A process that includes a chemical reaction that binds liquids to the solid matrix (i.e., it is not solely a physical process). Solidification by stabilization is typically termed "solidification" in the regulations and guidance applicable to low-level radioactive waste and "stabilization" in the regulations and guidance applicable to hazardous waste.

Waste Stream – Waste with similar physical, chemical and radiological properties that can be adequately characterized by a single waste profile. In no case may a waste stream represented by a waste profile encompass more than one waste category as defined in Section 4 of this WAP. If a single process generates wastes that may represent different waste categories due to processing variables, each separate category of waste from that process must be profiled separately as a distinct waste stream and must be segregated accordingly by the generator at the point of generation.

# 3.0 WASTE CHARACTERISTICS AND WASTE FORM REQUIREMENTS

In accordance with 30 TAC 336.362, WCS requires that LLRW meet certain waste characteristic and waste form criteria as described below in WAP Sections 3.1 through 3.10. The waste generator collects and reports appropriate waste data to satisfy these criteria, as part of the waste profile development process described in WAP Section 5.2.1. WCS reviews and confirms these data to the extent necessary for verification of LLRW classification/characterization and hazardous waste determination, as part of the waste profile approval process described in WAP Sections 5.2.2 through 5.2.4. In the event that the generator does not provide all information necessary to satisfy the waste characteristic and form criteria identified below, WCS may elect to develop the missing information by analyzing a representative sample of the waste in accordance with the requirements of this WAP.

## 3.1 Radiological Parameters

LLRW and LLMW must be classified as Class A, Class B, or Class C waste; therefore, the presence and activity concentrations of the following radionuclides must be known:

- C-14
- C-14 in activated metal
- Cm-242
- Co-60
- Cs-137
- H-3
- I-129
- Nb-94 in activated metal
- Ni-59 in activated metal
- Special Nuclear Material
- Ni-63
- Ni-63 in activated metal
- Pu-241
- Ra-226
- Sr-90
- Tc-99
- Alpha-emitting transuranics with half lives greater than 5 years
- Total of all radionuclides with less than a 5-year half life

Radionuclide activity concentrations must be known with sufficient precision to classify the waste according to the limits and ranges specified in Tables I and II of 30 TAC 336.362(a)(3)(D) and 30 TAC 336.362(a)(4)(E). In addition, radionuclide concentrations of Cl-36 must be known with sufficient precision to support RML R04100 performance assessment updates. Radionuclide concentrations may be averaged in accordance with 30 TAC 336.362(a)(8) and Title 10 of the Code of Federal Regulations (CFR) 61.55(a)(8). Waste generators may obtain activity concentrations from:

1. direct measurement;
2. calculations using measured values as input; and/or
3. process knowledge that has measured values as a basis.

Measurements must be made using properly calibrated industry standard equipment and using industry accepted methods. Waste classification should conform with the United States Nuclear Regulatory Commission (NRC) "Final Branch Technical Position on Concentration Averaging and Encapsulation, Revision in Part to Waste Classification Technical Position, January 17, 1995" (January 1995 BTP). In accordance with 35 TAC 336.229, no person may reduce the concentration of radioactive constituents by dilution to meet exemption levels established under the Texas Health and Safety Code 4.1.106. Low-level radioactive waste that has been diluted as a result of processing, stabilization, mixing, or treatment, including, but not limited to, 40 CFR Part 268, or for any other reason, shall be subject to the disposal regulations it would have been subject to prior to dilution, except for sealed sources.

The FWF-NCDU will dispose Bulk Soil/Soil like waste as defined in Section 4.1 of this document. The FWF-CDU and the CWF will dispose Bulk Soil/Soil Like Waste and Bulk Debris within the designated areas defined as In-Cell Non-Containerized Disposal Units. Containerized Waste will be disposed inside MCCs within the FWF-CDU and CWF.

RML R04100 limits aboveground possession of SNM at the WCS LLRW facility. The tracking, management, and handling of SNM is addressed in LL-OP-1.4 *Special Nuclear Material.*

## 3.2 Gases

LLRW and LLMW with radionuclides in gaseous form must be packaged such that the absolute pressure does not exceed 1.5 atmospheres at 20 degrees Celsius and total activity does not exceed 100 curies per container. Gaseous wastes will not be accepted for disposal in the FWF-NCDU or in In-Cell Non-Containerized Disposal Units within the FWF-CDU or CWF.

## 3.3 Free Liquids

LLRW and LLMW are subject to restrictions on the amount of free liquids and free-standing liquids that may be present in the waste. Free liquids/free-standing liquids that are present in a waste as-generated must be physically removed and/or treated as necessary to meet the restrictions applicable to the particular waste and its intended disposal unit. Free liquid requirements were established to ensure compliance with the low-level radioactive waste disposal requirements found in 30 TAC 336.362(b)(1)(C) and (D) and, as applicable, the hazardous waste disposal requirements found in 30 TAC 335.175 and 264.316 (adopted by reference in 30 TAC 335.152(a)(12)). Definitions of free liquids, free-standing liquids, solidification by absorption, and solidification by stabilization are presented in WAP Section 2.0.

### 3.3.1 CWF Free Liquid Requirements

LLRW that is disposed within MCCs in the CWF must contain as little free-standing liquid and non-corrosive liquid as possible. WCS will not accept LLRW for disposal in the CWF that has in excess of 1% by volume free-standing liquid in a waste container. If a waste does not meet this criterion in its as-generated form, the generator or processor must solidify the liquids, by either absorption or stabilization, or package the waste in a quantity of non-biodegradable absorbent

material sufficient to absorb twice the quantity of free-standing liquids prior to shipment of the waste to WCS. LLRW to be disposed within In-Cell Non-Containerized Disposal Units in the CWF must not contain any free-standing liquids. LLRW to be disposed within In-Cell Non-Containerized Disposal Units in the CWF that contains free liquids at the point of generation must either be solidified by absorption with a non-biodegradable absorbent or solidified by stabilization by the waste generator or processor prior to shipment to WCS for disposal.

### 3.3.2 FWF Free Liquid Requirements

Waste to be disposed of in the FWF-NCDU or the FWF-CDU must not contain any free liquids as measured by the Environmental EPA PFLT. If such waste is LLRW and contains free liquids at the point of generation, it must either be solidified by absorption with a non-biodegradable absorbent or solidified by stabilization by the waste generator or processor prior to shipment to WCS for disposal. If such waste is LLMW and contains free liquids at the point of generation, it must be solidified by stabilization by the waste generator or processor prior to shipment to WCS for disposal.

Containerized Waste, both LLMW and LLRW, intended for disposal in the FWF-CDU that contains free liquids at the point of generation must either be solidified by absorption with a non-biodegradable absorbent or solidified by stabilization prior to shipment to WCS, unless one or more of the following conditions apply to the LLMW or LLRW containers:

1. the LLRW package contains less than 1% by volume free-standing liquid in a waste container
2. the LLRW or LLMW container is designed to hold free liquids for use other than storage, such as a battery or capacitor, and the quantity of free liquids is no greater than 1% by volume
3. the LLRW or LLMW container is an over-packed drum, or lab pack, meeting the requirements of 40 CFR 264.316, and the inside containers are surrounded by sufficient non-biodegradable absorbent material to absorb twice the quantity of the liquid contents of the inside containers. This exception only applies to very small containers such as vials or ampules used in laboratory analyses

## 3.4 Hazardous Waste Regulated under RCRA Subtitle C

Hazardous wastes are regulated under RCRA Subtitle C and defined by 40 CFR Part 261. Wastes are considered hazardous due to the exhibition of a hazardous characteristic or are specifically listed as hazardous. A waste is a characteristic hazardous waste if it exhibits one or more of the following properties:

1. Ignitability, as defined at 40 CFR 261.21
2. Corrosivity, as defined at 40 CFR 261.22
3. Reactivity, as defined at 40 CFR 261.23
4. Toxicity, as defined at 40 CFR 261.24

The generator is required to provide full documentation that demonstrates that the waste has been properly characterized per 40 CFR Part 262 requirements.

### 3.4.1 CWF Hazardous Waste Conditions

The CWF cannot accept any LLMW for disposal. Treated characteristic wastes may be disposed of at the CWF, as long as the hazardous characteristic(s) has been removed and any underlying hazardous constituents meet LDR under 40 CFR Part 268. All formerly characteristic hazardous waste that has been treated to remove the characteristic code(s) must be accompanied by a LDR notification/certification as required in 40 CFR Part 268.

### 3.4.2 FWF Hazardous Waste Conditions

The FWF will accept LLMW in accordance with TCEQ Hazardous Waste Permit 50397. All LLMW must be accompanied by a LDR notification/certification as required in 40 CFR Part 268. LLMW containing RCRA codes F020, F021, F022, F023, F026, and F027 (dioxins & furans) are prohibited in the FWF.

## 3.5 Prohibited Waste

- Greater than Class C (GTCC)Waste
- Waste capable of detonation, explosive decomposition or reaction
- Waste that is water reactive
- Pyrophoric waste
- Waste capable of generating toxic gases, vapors, and fumes (excluding radioactive gases)
- LLMW in the CWF

## 3.6 Other Restricted Hazards

In accordance with 30 TAC 336.362(b)(1), waste containing hazardous, biological, pathogenic, or infectious materials shall be treated to reduce, to the maximum extent practicable, the potential hazard from non-radiological materials. Appropriate characteristic hazardous waste treatment will remove pyrophoric properties and eliminate the capability for detonation, explosive decomposition, explosive reaction, and the generation of toxic gases, vapors, or fumes harmful to persons managing the wastes. WCS will not accept a waste for disposal in the CWF or FWF that contains hazardous, biological, pathogenic, or infectious materials, unless the waste has first been treated to reduce the potential hazard from the non-radiological materials prior to final disposal.

## 3.7 Packaging Criteria

Waste will be received at the WCS LLRW facility in many different types of containers including, but not limited to, 5-gallon, 15-gallon, 30-gallon, 55-gallon, and overpack drums, soft and hard top roll-offs, B-25 and B-12 boxes, cubic yard boxes, supersacks, sealands, intermodals and DOT type-A and type-B casks. Waste may not be packaged for disposal in cardboard, fiberboard, or wood boxes. All waste must be packaged in conformance with license conditions, including those for hazardous, biological, pathogenic, or infectious waste, sealed sources, and special form radioactive material, and waste received over public highways must be packaged in accordance with applicable Department of Transportation (DOT) regulations. Waste received over private roads must be shipped in packages that meet the general design requirements listed in 49 CFR Part 173.410. Receipt of every container scheduled for shipment

will be evaluated per LL-OP-2.3 *Waste Shipment Authorization*, Section 5.6 to facilitate safe handling, storage and management of the waste containers.

Each profile must identify the disposal facility and whether the waste is containerized. With the exception of LCs, packages of Containerized Waste must be placed within reinforced modular concrete canisters at the WCS LLRW disposal facilities. Handling requirements of LCs are addressed in the project specific LC plan.

## 3.8 Waste Form and Stability Requirements

Waste form stability is intended to ensure that the waste does not degrade and affect overall stability of the disposal cell through slumping, collapse, or other waste degradation and thereby lead to water infiltration through the cover. A structurally stable waste form will generally maintain its physical dimensions and its form under the expected disposal conditions such as weight of overburden and compaction equipment, the presence of moisture, microbial activity, and internal factors such as radiation effects and chemical changes. Stability may also be a factor in limiting exposure to an inadvertent intruder.

General waste form stability requirements are found in 30 TAC 336.362. Bulk Soil/Soil Like Waste and Bulk Debris is required to meet the stability requirements found in 30 TAC 336.362(b) (1) once disposed. Containerized Waste is required to meet the stability requirements of 30 TAC 336.362(b) (2) once disposed.

With the exception of LCs as defined in WAP Section 4.7, Containerized Waste will be placed inside cylindrical or rectangular reinforced MCCs within the CWF and FWF-CDU. Each MCC will be filled with a flowable concrete grout to eliminate internal void spaces, and void spaces between the MCCs will be back filled with granular material to eliminate void spaces between canisters. The MCC will provide the stability for the containerized waste in order to meet 30 TAC 336.363 (b) (2). Void spaces within the waste shall be reduced to the extent practicable. In terms of waste disposed of at WCS, the maximum void space within a waste container, excluding LCs, shall not exceed 10% for mixed waste disposed in the FWF under the requirements of Permit 50397 and 15% for all other waste. This 15% value is based on engineering analyses performed to support the design of the CWF and FWF-CDU.

Bulk Soil/Soil-Like Waste and Bulk Debris is not required to be placed in an MCC. The FWF-NCDU will accept Bulk Soil/Soil Waste for non-containerized disposal and the FWF-CDU and CWF will accept Bulk Soil/Soil Like Waste and Bulk Debris for disposal within In-Cell Non-Containerized Disposal Units.

## 3.9 Other Performance Requirements

Chelating agents in the wastes were analyzed as part of the required performance assessment for near-surface disposal of low-level radioactive waste, in accordance with 30 TAC 336.707(5). Chelating agents have the potential for formation of radionuclide-chelate complexes that could enhance radionuclide migration in soil.

Chelating agents are used in decontamination processes to form chemical complexes that allow the removal of built-up radionuclides and corrosion products from the cooling systems of nuclear power plants using cation- or anion-exchange resins. These decontamination resins comprise the primary LLRW that may contain chelating agents and are anticipated to be generated by nuclear

power plants that will ship waste to the CWF for disposal. However, chelating agents have also been identified as potential components in a few of the FWF-CDU waste streams.

Consistent with the performance assessment parameters, WCS has established a maximum allowable limit of 8% by weight chelating agents per waste stream. The generator is required to provide WCS with detailed documentation that establishes a conservative upper bound for the typical concentration of chelating agents in each waste stream, or documentation that clearly demonstrates the lack of chelating agents in each waste stream.

### 3.10 License Conditions

#### 3.10.1 Future License Amendments

Waste characteristics and waste form requirements described above in WAP Sections 3.1 through 3.8 were developed to ensure compliance with applicable regulations and license conditions. The effected sections of this document will be modified accordingly if additional requirements are imposed by the TCEQ under future amendments to RML R04100.

### 3.11 ALARA Information

To identify safe handling procedures that maintain worker radiological exposures to ALARA criteria, the following parameters must be known:

1. Gamma and neutron radiation fields
2. Alpha and beta contamination levels
3. Package configuration
4. Isotopic concentrations
5. Package dose rates

This information will be used by the Radiation Safety Officer (RSO) to determine if an existing Radiation Work Permit (RWP) provides appropriate time, distance, shielding, engineering, and administrative controls that minimize operating personnel exposure and, if not, to develop an appropriate RWP in accordance with RS-1.6.1, *Radiation Work Permit*. This information is also used as necessary to perform specific ALARA reviews in accordance with RS-1.1.2, *ALARA Exposure Data Review*.

## 4.0 CATEGORIES OF WASTE FOR RECEIPT VERIFICATION

WCS identified seven categories of waste for the purpose of verifying that waste acceptance criteria have been met by incoming waste received for disposal. The seven waste categories were identified based upon the ability to obtain representative waste samples, ALARA considerations, and other personnel protection concerns. All incoming waste shipments are subject to verification by WCS, as described in WAP Section 6.1 through 6.3. In addition to verification by WCS, no shipment may be accepted for disposal unless it has been inspected by the TCEQ resident inspector.

Waste receipt verification is based upon a combination of intrusive inspections, intrusive sampling, and external verification techniques as described in WAP Section 6.3. Intrusive inspections involve opening waste packages and visually inspecting the waste material. Intrusive

sampling involves collection of physical samples of the incoming waste materials in sample containers for laboratory analyses. Intrusive inspections will be conducted where this activity does not violate ALARA principles or otherwise represent an unacceptable health risk to inspection personnel. Intrusive sampling will be conducted on intrusively inspected wastes that are homogenous in physical form to allow collection of a representative sample using conventional methods. External verification methods will be used when conditions do not permit intrusive inspections and intrusive sampling.

The following wastes will be identified during the waste profile review (see WAP Section 5.2) and will be excluded from intrusive sampling or inspection due to health and safety concerns:

1. Containers with wastes that could release radon or tritium gas upon opening
2. Containers with wastes that could release fine, dispersible radioactive particulates (e.g., ash) upon opening
3. Containers with biohazard wastes
4. Containers with sharps from any source (including sharps that are not biohazard waste)
5. Any other containerized waste as authorized by the TCEQ for this purpose.

## 4.1 Bulk Soil/Soil-Like Waste

This waste category consists of Class A wastes streams composed predominantly of soil and soil-like materials that meet the requirements noted in this section. The waste streams are generally shipped in bulk containers (e.g., intermodals, rolloffs, B-25 boxes and soft-side packaging). These wastes will be accepted for disposal in the FWF-NCDU and within In-Cell Non-Containerized Disposal Units in the FWF-CDU and the CWF if all of the following requirements are met:

- Soil-like waste must exhibit acceptable levels, fine content, and plasticity characteristics as defined by Appendix 1 as determined by using ASTM D2487. Except as discussed below soil and soil-like waste with fine content greater than 35% and medium to high plasticity will not be considered Bulk Soil/Soil Like Waste.
- Soil and soil-like waste having fine content greater than 35% and non-plastic to low plasticity shall be disposed of in combination with other acceptable soil and soil-like material as specified in Table 4.1.
- Soil and soil-like waste having fine content greater than 10% but less than or equal to 35% and medium to high plasticity shall be disposed of in combination with other acceptable soil and soil-like material as specified in Table4-1.
- The average, in-place organic content of soil and soil-like waste does not exceed five percent (5%) and the average, as received organic content of any individual waste shipment does not exceed ten percent (10%) by using ASTM D-2974.
- Dose rates of each container are less than 100 millirem per hour at 30 centimeters.

- No free liquids as measured by the Environmental EPA PFLT.

Bulk Soil/Soil-Like (BS) wastes are comprised of a relatively homogeneous physical form that is amenable to collection of representative samples. These wastes will be intrusively inspected and sampled. Waste streams/containers that are a mixture of BS and Bulk Debris, as defined in Section 4.2 of this document, will be managed as BS if the waste stream/container contains more than 50% soil like waste by visual inspection. However, if the Bulk Debris is separated out for disposal within a debris lift within In-Cell Non-Containerized Disposal Units in the FWF-CDU or the CWF, the Debris will be subject to testing and stability requirements for Bulk Debris found within this document.

**Table 4.1**

| **Soil Acceptance and Blending for Disposal in In-Cell Non-Containerized Disposal Units** | | | | |
|---|---|---|---|---|
| | | **Fines Content per ASTM D2487** | | |
| | | 0-10% | **10-35%** | Greater Than 35% |
| **Plasticity per ASTM D2487** | Nonplastic to Low Plasticity | May be disposed of "**as is**" or in combination with other higher fine content materials | **May only be disposed of "as is"** | One (1) unit by volume of this material may only be disposed of if mixed with four (4) units by volume of non-plastic or low plasticity material with 0-10% fine content |
| | Medium to High Plasticity | May only be disposed of "**as is**" | One (1) unit by volume of this material may only be disposed of if mixed with four (4) units by volume of non-plastic or low plasticity material with 0-10% fine content | Not acceptable for disposal as bulk waste |

## 4.2 Bulk Debris/Rubble

This waste category consists of Class A wastes streams composed of Debris. Debris is more heterogeneous than soil-like waste, and may be incorporated into a waste disposal lift using separate placement practices so that the overall required density is assured. The waste streams are generally shipped in bulk containers (e.g., intermodals, rolloffs, B-25 boxes and soft-side packaging). These wastes will be accepted for disposal in bulk form within In-Cell Non-Containerized Disposal Units in the FWF-CDU and the CWF. This waste category will be generally free of visible biodegradable items such as wood, paper, and plastic fractions, although incidental or imbedded pieces of Debris may be present. Observation of occasional biodegradable items would not require the waste shipment to be rejected. These wastes will be accepted for disposal in the FWF-NCDU and within In-Cell Non-Containerized Disposal Units in the FWF-CDU and the CWF if all of the following requirements are met:

- Each container must be at least 50% Debris based upon visual inspection.
- The biodegradable content of the waste must be less than 5% by volume.
- Dose rates of each container are less than 100 millirem per hour at 30 centimeters.
- No free liquids as measured by the Environmental EPA PFLT.

Bulk Debris (BD) is not amenable to the collection of representative samples due to its physical nature. Debris wastes, other than the exclusions identified above in Section 4.0, will be intrusively inspected and subject to external assay procedures as delineated in WAP Section 6.3, given their relatively low hazard and the fact that collection of representative samples of these wastes is not practicable. Packages of debris wastes excluded from intrusive inspection and sampling will be managed in the same manner as high container dose rate wastes, as described in WAP Section 4.5. Waste streams/containers that are a mixture of BS and BD will be managed as BD if the waste stream/container contains more than 50% Debris by visual inspection; however, if the soil is segregated for disposal in a soil lift within the FWF-NCDU or within an In-Cell Non-Containerized Disposal Units in the FWF-CDU or CWF, the soil like waste will be subject to the testing and stability requirements of BS found within this document.

## 4.3 Containerized Soil-Like Waste

This category consists of wastes composed predominantly of soil and soil-like materials shipped in smaller containers such as soft-side packaging, metal boxes, and drums, where at least 10% of the containers of each waste stream have a dose rate of less than 100 mrem/hr at a distance of 30 cm. Containerized Soil-Like (CS) wastes will be received for disposal in the FWF-CDU and the CWF. These wastes are relatively homogeneous in physical form and amenable to collection of representative verification samples.

CS wastes, other than the exclusions identified above in Section 4.0, will be subject to intrusive inspection and sampling given the relatively low hazard and relatively homogeneous physical form. Packages of CS wastes that are excluded from intrusive inspection and sampling will be managed in the same manner as high container dose rate wastes, as described below in WAP Section 4.5.

## 4.4 Containerized Debris

This category consists of Debris that are shipped in smaller containers such as soft-side packaging, DOT compliant surface contaminated object (SCO) wraps, metal boxes, and drums, where at least 10% of the containers of each waste stream have a dose rate of less than 100 mrem/hr at a distance of 30 cm. This category also includes sealed sources packaged in accordance with DOT and license requirements. All Containerized Debris (CD) wastes may be accepted for receipt in the FWF-CDU or the CWF, since the debris must be placed within MCCs for disposal. Containers holding a mixture of Debris and other material is managed as Debris if the mixture is comprised primarily (50% or greater) of Debris, by volume, based on visual inspection. Shielded containers are not included in this waste category. Debris is not amenable to the collection of representative samples due to its physical nature.

CD wastes, other than the exclusions identified above in Section 4.0, will be intrusively inspected and subject to external assay procedures as delineated in WAP Section 6.3, given their relatively low hazard and the fact that collection of representative samples of these wastes is not practicable. Packages of CD wastes excluded from intrusive inspection and sampling will be managed in the same manner as high container dose rate wastes, as described in WAP Section 4.5.

## 4.5 High Container Dose Rate Waste

This waste category consists of all unshielded, containerized wastes, where 90% or more of the containers of each waste stream have a dose rate between 100 mrem/hr at a distance of 30 cm and 1 rem/hr at the surface of the container. High container dose (HCD) rate wastes will be shipped in containers such as soft-side packaging, metal boxes, drums, and high integrity containers. This waste stream does not include waste shipped in a DOT shielded cask. Typical HCD wastes include decontamination resins that do not require shipment in shielded containers.

Containers with HCD wastes and containers managed as HCD wastes will not be opened at WCS for intrusive inspection or sampling due to ALARA and other potential health and safety considerations. Containerized wastes that would otherwise fall into the CS or CD categories, but will not be opened due to specific health and safety issues will be managed in the same manner as HCD wastes. Containers with HCD wastes and containers managed as HCD wastes will be inspected and verified via external assay procedures as described in WAP Section 6.3.

## 4.6 Cask Wastes

This waste category consists of any waste that must be shielded in order to meet shipping requirements, any waste shipped in DOT shielded cask regardless of dose rate, and any container with a dose rate greater than 1 rem/hr at the surface of the unshielded container.

These containers will not be opened at WCS for intrusive inspection or sampling. The results of the radiological surveys of the incoming shielded containers will be evaluated for waste verification as described in WAP Section 6.3.

## 4.7 Large Components

Large components are defined as equipment and large items that will not fit into a MCCs; items that, for other considerations, will not be placed in an MCC; and other waste for which disposal within an MCC may not be desirable. Other considerations include the level of radiation exposure presented to facility personnel, costs of managing the waste, and benefits gained by best management practice of ALARA. Items that will be disposed in a debris lift of the IC NCDU, and would otherwise fall under this definition will not be considered a Large Component.

Large components will not be intrusively sampled nor will any of the seals or covers on any openings be disturbed or penetrated due to ALARA considerations. The results of the radiological surveys of the LC or the incoming shielded containers will be evaluated for waste verification as described in WAP Section 6.3.9.

Additional details on the management of LCs may be found in the WCS *Compact Waste Disposal Facility Large Component Disposal Plan* submitted to the TCEQ on May 14, 2010 as a requested amendment to RML R04100.

# 5.0 GENERATOR AND WASTE APPROVAL PROCESS

Each generator shall be certified by WCS and issued a generator identification number in order to be eligible to ship waste to either the CWF or the FWF. This section describes the general requirements for the generator certification process and the profile approval process. The step-by-step instructions utilized by WCS personnel to perform generator certification and profile approval are detailed in procedures LL-OP-2.2, *Generator Certification* and LL-OP-2.1 *Profile Approval*.

## 5.1 Generator Certification

All generators are required to submit a generator certification packet as described in WAP Section 5.1.1. Each generator certification packet may be accompanied by multiple waste profiles, one for each waste stream the generator proposes to ship to WCS. On-site audits will be conducted as required in WAP Section 5.1.2. Certified generators will be issued a generator identification number that must be re-issued through the generator certification process on an annual basis. Only generators with an approved generator identification number will be authorized to ship wastes to the CWF or the FWF.

The generator who provides profile information is considered to be the generator requiring certification under this WAP. Waste brokers that perform collection, consolidation, profiling, manifesting, and shipping of waste to the WCS CWF or FWF are required to be approved under the WCS Generators Certification Process detailed in this section. These brokers are responsible for having programs and verifications in place that ensure the waste meets all WCS waste acceptance requirements.

Generators who ship wastes to either the CWF or the FWF that do not meet regulatory requirements or otherwise result in the occurrence of a major discrepancy shall be designated as non-compliant as described in WAP Section 7.0. WCS will suspend the generator identification number of any generator designated as non-compliant. Generators found to be non-compliant must apply for re-certification by resubmission of the generator certification packet. The resubmitted packet must be revised to reflect measures taken to prevent the reoccurrence of the violation that resulted in the non-compliance. Non-compliant generators are also required to undergo the site audit process to qualify for re-certification, regardless of the waste receipt categories associated with the generator's wastes.

### 5.1.1 Requirements for All Generators

Each generator shall submit a generator certification packet to WCS to obtain certification. The generator certification packet should contain documentation of all of the following programs as applicable:

- The generator's Waste Classification/Characterization Program, including:
  - Sampling and analytical procedures and frequencies;
  - QA/QC procedures;
  - Procedures for determining the upper concentrations or absence of chelating agents;

- Procedures for ensuring that free liquid and void space limitations are met upon receipt at WCS; and
- Procedures for verification of compliance with RCRA regulation to include determination of non-hazardous for LLRW and verification of treatment as necessary to meet the RCRA Land Disposal Restrictions (40 CFR Part 268) for LLMW.

- The generators Process Control Program if the generator will use process knowledge to characterize one or more wastes.
- The generator's LLRW/LLMW shipping procedures or plans to include determination of proper packaging, and transportation requirements.
- Radiation Safety procedures associated with inbound/outbound shipments.
- Personnel Training Program: applicable to staff performing waste classification/ characterization and shipping activities including radiation safety functions.
- Copy of the generator's Radioactive Material License, including contact information for the license-issuing agency.
- Regulatory agency or third-party audit and non-compliance reports / notices for the last 12 months. Also include responses and/or corrective action information for each non-compliance report/notice.

WCS will review each generator certification packet and contact the generator if any clarification or additional information is needed. An audit of a generator is an automatic condition of the certification process if any of the generator's wastes to be shipped to the LLRW disposal facility will not be subject to intrusive sampling and/or inspection upon receipt. If an audit is not an automatic condition of generator certification, and if the generator's documentation demonstrates that the waste characterization and associated programs meet the requirements of this WAC, WCS will typically approve the generator certification packet. However, if WCS identifies potential inadequacies or deficiencies in the generator's waste classification/characterization, packaging/shipping, or other associated programs, or if the generator's compliance history demonstrates a history of pertinent deficiencies and/or failures to prevent problem recurrence, WCS will typically require an on-site audit to further evaluate the generator. WCS may elect to not certify a generator based on the certification packet review, the on-site audit, or failure to complete approved corrective and preventative actions, as applicable.

Upon approval of the generator certification packet, WCS will issue a generator identification number to the generator. The generator is to place its generator identification number on documentation or correspondence sent to WCS regarding waste disposal at the LLRW disposal facility.

Annual re-certification is required for all generators. Typically, generators will be notified to submit an updated generator certification packet 90 days prior to the expiration of the current certification to allow sufficient time for audit preparation and scheduling, as necessary. Generators are requested to submit an updated generator certification packet at least 60 days prior to the expiration of the current certification. If information in the previous generator certification packet remains accurate and inclusive of current programs, the generator may submit a properly executed certification statement that the prior certification packet remains accurate and inclusive, in lieu of re-submittal of previously submitted documentation.

### 5.1.2 Required Generator Audits

When generator submitted waste profile information indicates that the waste meets the definition of cask waste, HCD waste, large components, and/or waste that is managed as HCD waste, WCS will perform an on-site audit except as provided in WAP Section 5.1.3 or a variance is granted by TCEQ. This audit will encompass the generator's LLRW and LLMW classification/characterization; chelating agent characterization; packaging/shipping; and other associated programs, practices, and records as part of the certification process for that generator.

WCS may also perform an on-site audit for cause based upon review of the generator certification packet. If the waste profile information submitted with the generator certification packet indicates that none of the generator's waste streams will exceed WCS' cutoff criteria for intrusive inspection/sampling, but the generator subsequently identifies one or more additional waste streams where WCS' cutoff criteria for intrusive inspection/sampling is exceeded, the generator will be subject to an on-site audit and a waste profile review process for the additional waste. Any generator whose identification number is suspended due to non-compliance as described in WAP Section 7.0 must undergo an audit, regardless of the waste receipt categories associated with the generator's wastes, as part of the re-certification process.

In addition to following procedure LL-OP-2.2 *Generator Certification*, applicable portions of QA-18.1 *Audits* will be implemented (sections applicable to WCS internal audits are not applicable). The purpose of the generator site audit is to verify that the generator's waste classification/characterization, chelating agent characterization, waste stream process control, and packaging/shipping programs are being implemented in accordance with the documentation that was provided to WCS in the generator's certification packet. Successful completion of the site audit is a condition for certification of these generators and issuance (or re-issuance) of their generator identification number.

WCS will develop an audit plan for each generator to be audited. The plan will include audit procedures and/or checklists that reflect specific elements of the programs submitted in the generator certification packet to determine compliance with this WAP. The following activities may be reviewed as part of the generator site audit:

- observe or verify on-site waste handling procedures, including transfer, storage, processing, packaging, and shipment preparation procedures;
- interview personnel with direct and supervisory responsibility for waste classification/characterization and waste handling;
- observe or verify the actions taken to ensure that wastes shipped to the LLRW facilities meet each waste acceptance criterion (absence or quantity of free liquids, void space in containers, non-hazardous waste determinations for LLRW, LDR compliance for LLMW, etc.);
- observe or verify the performance of measurements, analyses, calculations, or other methods used to classify and characterize radioactive waste;
- review records documenting use of chelating agents and the basis for the generator's waste profile information regarding chelating agents; and
- review records documenting radioactive waste classification and characterization for waste shipments made during the previous year, regardless of the facility to which it was shipped, including, as applicable, process knowledge documentation.

### 5.1.3 Nuclear Power Plant Inspection Reports

Due to the robust regulatory control imposed upon nuclear power facilities by the NRC, the integrity of the inspecting body, and the thoroughness of the inspection program, nuclear power facilities will not have to go through the on-site audit process except "for cause." Nuclear power facilities will submit the latest NRC inspection report covering the area of Radioactive Material Processing and Transportation to WCS along with the generator certification packet as required in WAP Section 5.1.1. In the event the NRC inspection report brings into question the facility's ability to compliantly deliver waste to WCS, a "for cause" site audit will be performed.

## 5.2 Waste Profile Approval

The profile approval process involves multiple steps incorporating interdisciplinary review of generator-supplied information for waste acceptability, analysis of a pre-shipment sample (if applicable), and verification cross-checks. WCS will evaluate the waste profile information and supporting documentation provided by the generator for each waste stream to ensure the waste is acceptable for receipt and disposal in the designated LLRW disposal facility. A generator must profile each waste stream separately.

The profile approval process is summarized in the following sections.

### 5.2.1 Waste Profile Form

The generator must complete a separate Waste Profile Form (WPF), form number LL-OP-2.1-1 for each waste stream that is a candidate for disposal at the LLRW disposal facility and provide any supporting documentation necessary. The generator is required to certify that the characterization information provided on each WPF and supporting documentation is correct. The completed WPF and supporting documentation must allow WCS to demonstrate that the waste is compliant with regulatory requirements and license and permit conditions applicable to the LLRW disposal facility.

Information to be provided with the WPF includes:

- generator and license information;
- waste stream characteristics (regulatory classification; physical, chemical and radiological composition; chelating agent information);
- compact status (in-compact or out-of-compact);
- Import status for out-of-compact waste;
- export status from other compacts for out-of-compact waste; and
- for LLMW, the LDR information and documentation that the waste meets LDR treatment standards.

The following radionuclides are required to be placed on a WPF:

- Enriched U-235, enriched U-233, Pu-239, and Pu-241;
- Radionuclides that are required to be listed in accordance with the latest version of 540/541/542 Instructions- NUREG guidance document BR-0204 (currently Rev.2 ,July 1998)

- Radionuclides that are required to be listed in accordance with 49 CFR Part 173.433(c)(2);
- Radionuclides that affect the dose rate of a package or shipment;
- Uranium and/or thorium considered source material;

Analytical data is typically required to be submitted with the WPF. The data must be accompanied by an identification of the analytical method used for each parameter or constituent reported, and by Quality Assurance/Quality Control (QA/QC) results. The generator must employ analytical methods approved by recognized entities (i.e., EPA, Department of Energy (DOE), ASTM, or AASHTO) for waste analyses supplied with the WPF whenever possible. The generator may conduct analyses via other industry-accepted methods as necessary to classify and characterize the waste; however, the need to use these other methods shall be documented by the generator.

The generator may use process knowledge to augment analytical data in completing the WPF, as long as there is reasonable assurance that this approach can be correlated by bounding or other relationships to actual measurements or known quantities. In certain cases, process knowledge alone may be sufficient to adequately characterize a waste (e.g., spill cleanup residues from a previously characterized waste; containers that have been emptied of their prior contents where the composition of the prior contents is known). Process knowledge may include use of scaling factors to develop inferred concentrations of radionuclides based on measured concentrations of other radionuclides or radionuclide material accountability. Documentation of the generator's process control program will be required if process knowledge will be used in characterizing a waste stream that is a routinely-generated waste resulting from a commercial or industrial process.

For other waste streams, including demolition wastes and other debris, the generator must thoroughly document the basis for classification and characterization of the waste stream and include any pertinent analytical data or known composition information for chemical and radioactive materials with which the waste materials may have been in contact. The methods identified in the January 1995 BTP are acceptable.

Wastes received at the LLRW disposal facilities must also meet the applicable waste form and stability requirements identified in WAP Section 3.7. The WPF must provide sufficient documentation that the waste stream satisfies these waste form and stability requirements as shipped, or any of the requirements not met by the as-shipped waste will be met by virtue of the intended disposal mechanism at the WCS LLRW disposal facility. WCS may elect to determine some of this information on behalf of the generator through the analysis of a pre-shipment sample.

Generators must provide sufficient evidence that the waste stream in question was generated in Texas or Vermont or has been approved for importation by the Texas Compact Commission.

The generator's WPF and supporting documentation, in conjunction with the information in the generator's certification packet, must demonstrate reasonable assurance that the waste is correctly classified as Class A, Containerized Class A, Class B, or Class C; that any and all hazardous characteristics and constituents have been identified; and that the concentration of any chelating agents have been conservatively established. The combined documentation must include the methodology used to classify/characterize the waste and the basis upon which the

classification/characterization was established. This documentation must clearly demonstrate that the basis for classification/characterization is adequate and appropriate.

Generators are required to re-certify the WPF information on an annual basis. When the process generating a waste or the character of a waste changes from the information presented in the current WPF, a new WPF must be submitted to WCS for review and approval prior to scheduling additional shipments of the waste.

### 5.2.2 Initial Waste Profile Review

WCS will review the WPF and supporting documentation for completeness, and work with the generator as required to obtain a complete and accurate profile. Once complete, the profile information will be entered into the electronic waste tracking database (if not electronically submitted by the customer), and the waste profile information will be reviewed for compliance with this WAP, the LLRW license, the RCRA permit if applicable and applicable regulations.

The initial review will include the radiological, chemical, physical, and biological information provided by the generator, in conjunction with the description of the sampling and analysis program provided as part of the generator certification packet. This information must provide evidence that the waste stream in question complies with all requirements in WAP Section 3. For chelating agents, the review will involve determining that the generator's records documenting the characterization of chelating agents were satisfactory, and that the incremental contribution of the weight fraction of chelating agents in the waste will not have the potential to cause the limit on the weight percent of chelating agents that can be disposed within each disposal unit to be exceeded. Physical information for waste that is intended for disposal in the FWF-NCDU, or within In-Cell Non-Containerized Disposal Units in the FWF-CDU or the CWF will be reviewed to determine if it conforms to the requirements for assuring structural stability as described in WAP Section 4.1 or 4.2 as applicable. Photographic documentation of waste streams may be required by WCS as part of the profile review process. Proposed waste packaging will be reviewed to ensure that it is in compliance with license conditions and applicable DOT and TCEQ regulations.

Each profile review will include a multi-disciplinary review by authorized personnel from several departments. Review process steps depend upon the incoming shipment receipt sampling requirements for the waste stream in question. If the waste stream is not going to be sampled (CD, HCD waste, waste managed as HCD waste, and Cask Waste), the waste profile and supporting documentation will be submitted for final approval. If the waste stream will be sampled (BS waste and CS waste), WCS will follow the steps listed in Section 5.2.3.

### 5.2.3 Pre-Shipment Sample

An authorized reviewer shall determine the applicable sampling, inspection, and/or analytical requirements for the pre-shipment sample and/or incoming shipments. The generator will then be asked to provide a representative pre-shipment sample. Each time a generator is required to submit a new profile packet, a new pre-shipment sample will be required to be provided after the profile has been conditionally approved (including annual re-certification, if the generator indicates that changes in the nature of the waste or the waste generation process have occurred). The conditions that require a generator to submit a new profile packet for a previously approved waste stream are identified in WAP Section 5.2.1. The generator must provide proper Chain-of-

Custody documentation and a signed certification that the sample is representative of the entire waste stream population to be shipped to WCS. The Chain-of-Custody must accompany the sample.

Once a pre-shipment sample is received, WCS will perform and/or contract with an approved off-site laboratory to perform analyses for concurrence of: radiological classification, characterization, and fingerprinting; hazardous waste verification (hazardous characteristics for LLRW and treatment verification pursuant to the Land Disposal Restrictions (LDR) of 40 CFR Part 268 for LLMW), and chemical/physical fingerprinting.

Fingerprinting consists of a few laboratory and/or field tests that are used to capture the basic physical, chemical, and radiological characteristics of a waste stream. This information is used to verify that incoming shipments of waste match the basic characteristics of the pre-shipment sample.

If the concentration of any radionuclide present in the waste stream exceeds the license limits of all off-site laboratories approved by WCS, and WCS does not have the capability to perform the required analytical methods, then these analyses will not be performed on the pre-shipment sample. This category of waste stream will be subject to a rigorous on-site generator audit that focuses on the characteristics that would have been verified through off-site laboratory analysis, in conjunction with the chemical/physical fingerprint analyses and radiological fingerprint parameters performed by WCS, prior to approval of any shipment associated with the profile. Facilities excepted from on-site audits per WAP Section 5.1.2 or the TCEQ will not be subject to this audit.

Analyses of pre-shipment samples will be performed for the following parameters, as appropriate for the specific waste, using the referenced analytical methods.

*Radiological Classification, Characterization, and Fingerprinting*

- Gamma emitting radionuclides – gamma spectroscopy (HASL-300). This analysis is used for classification, characterization, and fingerprinting.
- Non-gamma emitting radionuclides (HASL-300/alpha spectroscopy/liquid scintillation/other approved methods as appropriate). Non-gamma emitting radionuclides may be scaled from gamma analysis if the generator has appropriate process knowledge. If WCS determines that this process is not applicable for the radionuclides that are present in waste stream or the generator does not have appropriate process knowledge to make this determination, WCS will analyze the sample via alpha spectroscopy and/or liquid scintillation as applicable.

*Hazardous Waste Verification - LLRW*

- Ignitability, corrosivity, and reactivity characteristics, D001-D003 (SW-846)
- Toxicity characteristics, D004-D043 (SW-846 Toxic Characteristic Leaching Procedure (TCLP) or total analyses)

*Hazardous Waste Verification - LLMW*

- All applicable LDR-required analytical methods per 40 CFR Part 268.48 (SW-846 TCLP or total analysis)

*Chemical/Physical Fingerprint Analyses*

- Free Liquids (SW-846 Method 9095)
- Reactivity/water compatibility (ASTM D 5058 or equivalent method)
- Cyanide screen (ASTM D 5059 or equivalent method)
- Sulfide screen (ASTM D 4978 or equivalent method)
- pH/corrosivity (ASTM D 4980 or equivalent method)
- Flammability (ASTM D 4982 or equivalent method)
- Density (ASTM D 5057 or equivalent method)

*Bulk Soil Waste Verification (if the generator supplies this analytical, WCS will not reanalyze)*

- Soil Classification (ASTM D2487/AASHTO M145 or equivalent method)
- Moisture Density Relationship (ASTM D1557 or equivalent method)
- Total Organic Content (ASTM D 2974/AASHTO T267 or equivalent method)
- Standard Proctor (ASTM D-698 or equivalent method to determine optimum moisture content)

Off-site laboratories contracted by WCS to perform these analyses are qualified by WCS according to QA-7.1, *Supplier Qualification* before they are approved for use and at least once every three years thereafter. WCS will only qualify laboratories accredited under TCEQ's Agency's National Environmental Laboratory Accreditation Program (NELAP). Analytical data generated by off-site laboratories are reviewed by WCS to ensure that: the data were obtained using proper preparatory and analytical methods, appropriate QA/QC procedures were followed, and that QA/QC data were within acceptable limits. This review will be cross-checked and approved by a second authorized WCS reviewer prior to use of the off-site generated laboratory data.

The analytical data generated from the analysis of the pre-shipment sample will be reviewed for conformance with the WPF and associated documentation and compliance with the WCS WAP, the WCS LLRW license, and applicable regulations. The analytical data for the pre-shipment sample will be reviewed to ensure the pre-shipment sample conforms to the WPF information. Any profile non-compliance issues will be resolved with the generator. Once any outstanding issues have been resolved, a baseline pass/fail criterion will be developed for each of the radiological and chemical/physical fingerprint parameters for comparison to fingerprint results of future shipments. The profile review documentation will then be completed and forwarded to a final authorized WCS reviewer for concurrence.

### 5.2.4 Final Waste Profile Review

The final authorized WCS profile reviewer will review the documentation to verify WPF conformance and compliance with the WAP, the LLRW license, and applicable regulations. This review will focus on ensuring the WPF, supporting documentation, and disposal plans are complete and compatible, and there are no discrepancies within the different WCS department approvals. Any issues identified by the final reviewer must be resolved before the profile is approved. The RSO may conduct and complete the compliance verification review. If the waste or information associated with the profile does not comply with, cannot be brought into

compliance with, or cannot be substantiated as being in compliance with the WAP, the LLRW license and/or applicable regulations (including but not limited to the waste classification, waste characterization, or chelating agent evaluation) the profile will not be approved, and the customer will be notified. Once the final reviews are complete and the waste is found to be in compliance, the waste stream is considered approved and the customer will be notified.

### 5.2.5 Large Component Specific Information Submission

For each LC project, WCS will develop and submit to TCEQ a specific, comprehensive, and integrated plan for disposal of LCs. This submission is required by the "Compact Waste Disposal Facility Large Component Disposal Plan" submitted to the TCEQ on May 14, 2010 as a requested amendment to RML R04100. Each LC-Specific Information Submission Project Plan will comply with RML R04100, Condition 148 and 149 and will include at a minimum the following:

1. Transportation Plan
2. Lift Plan
3. Disposal Placement Plan
4. ALARA Plan
5. Waste Profile for each unique LC or LC project

WCS will submit the LC-Specific Information Submission Project Plan to TCEQ approximately 90 days prior to the planned date of receipt of a LC, for review and concurrence.

# 6.0 WASTE RECEIPT

Inspections, radiological surveys, sample collection and analyses, as applicable, and acceptance of incoming waste shipments will be performed and documented in accordance with the appropriate LLRW disposal facility SOP's and RWP(s).

## 6.1 Pre-Shipment Review

The generator must obtain prior authorization from WCS for each waste shipment to be sent to the LLRW disposal facility in accordance with LL-OP-2.3, *Waste Shipment Authorization*. The generator must have received written or electronic confirmation from WCS that the shipment has been approved prior to shipping the waste. The generator is required to comply with all DOT, TCEQ, EPA, and NRC shipping requirements.

Upon receipt of a generator's request for shipment, WCS requires the generator to provide advance DOT paperwork to WCS for review. The advance DOT paperwork must include copies of DOT manifests and all supporting documentation required for the waste to be transported to the WCS LLRW disposal facility. Once WCS has verified that the generator has current WCS certification and the waste(s) proposed for shipment are covered by a current, approved WPF(s), a Waste Acceptance Specialist (WAS) will review the shipping information for each waste to ensure that it conforms to the approved WPF, thereby confirming that the waste to be shipped meets the WCS requirements for waste classification and waste form. WCS will also review the paperwork to ensure it is in compliance with applicable DOT, NRC, TCEQ, and EPA shipping requirements. If the shipping information conforms to the approved WPF, the WAS will notify and coordinate with appropriate facility management, including at a minimum, the Radioactive Waste Manager and the RSO, to verify that the facility can safely receive and manage the proposed shipment(s). Upon verification that the facility can safely manage the waste shipment(s), WCS will establish a delivery schedule with the generator or shipper, issue written authorization to the generator for the waste shipment(s), and enter the appropriate information in the waste tracking database and facility schedules (unless previously entered into the waste tracking database by the customer).

The concentrations of the following radionuclides are required to be placed on the DOT paperwork:

- Enriched U-235, enriched U-233, Pu-239, and Pu-241;
- Radionuclides that are required to be listed in accordance with the latest version of 540/541/542 Instructions- NUREG guidance document BR-0204 (currently Rev.2 ,July 1998)
- Radionuclides that are required to be listed in accordance with 49 CFR Part 173.433(c)(2);
- Radionuclides that affect the dose rate of a package or shipment;
- Uranium and/or thorium considered source material;

Prior to receipt, a WAS and Radiation Safety Technician (RST), as applicable, will prepare for arriving vehicles by reviewing the WPF, Waste Safety and Compliance Sheet, RWP, inspection

and/or sampling requirements, PPE requirements, and other ALARA requirements established for the scheduled activities.

## 6.2 Shipment Inspection, Surveying and Compliance Reviews

Once the vehicle arrives at the LLRW disposal facility, the RST will perform radiation and contamination surveys of the transportation vehicle in accordance with RS-4.2.1 *Survey of Incoming and Outgoing Radioactive Materials* and RS-4.2.2 *Transport Vehicle Release* Surveys to verify compliance with applicable DOT, NRC, and TCEQ shipping requirements for surface radiation. Once the RST clears the vehicle to proceed, a WAS will conduct a safety inspection of the vehicle in accordance with LL-OP-2.4, *Arriving Vehicle Inspection Procedure* to identify any potential safety issues. Any identified safety issues must be resolved in accordance with the procedure prior to entry to the FWF or CWF. The WAS will also conduct a compliance review of the shipment in accordance with LL-OP-2.5, *Waste Shipment Compliance Verification*. During this review, the WAS will determine if the information, including DOT shipping information, radiological information, and hazardous waste information, as applicable, is compliant with the advance DOT paperwork, the WPF information, and applicable regulations. The WAS then will visually inspect the conveyance for integrity and labeling consistent with the manifest. If possible during the conveyance inspection, the WAS will inspect each package of waste for integrity, marking, labeling, and conformance with the information on the manifest. If a moderate or major discrepancy is identified, it must be successfully resolved and documented as described in WAP Section 7.0 before the shipment is allowed to enter the designated receiving facility.

The WAS or RST will escort the vehicle to the applicable CWF or FWF staging building. An RST will perform radiation and contamination surveys of all incoming waste containers on the transportation vehicle or during the offloading process as specified in RS-4.2.1 *Survey of Incoming and Outgoing Radioactive Materials* and RS-4.2.2 *Transport Vehicle Release Surveys* If not already performed when the transport vehicle arrives, the WAS will inspect each waste container during offloading for integrity, marking, labeling, and conformance with the information on the manifest. The WAS will also determine the classification of each waste container based on the radionuclide information identified on the manifest and compare the WCS-determined waste class to the waste class identified by the generator on the manifest in accordance with LL-OP-2.6, *Waste Classification Verification*. If a moderate or major discrepancy is identified through the process of container inspection and waste classification verification, it must be successfully resolved and documented as described in WAP Section 7.0 before further management of the waste shipment is allowed.

## 6.3 Additional Waste Verification

Bulk soil/soil-like wastes, bulk debris, containerized soil/soil-like wastes, and containerized debris waste packages are subject to opening for sampling and/or inspection. Waste verification sampling methods shall conform to SW-846 or equivalent methods and applicable NRC and EPA guidance as appropriate. These analytical procedures and methods are identified in WAP Section 6.3.1. Waste verification sampling and inspection frequencies for each waste category are specified in WAP Sections 6.3.2 through 6.3.8.

WCS will evaluate the technical basis used by waste generators to characterize and manifest their waste streams (e.g., dose-to-curie conversion factors) that will be disposed of at the CWF and FWF. The purpose of this evaluation is to understand the technical approach used by generators to manifest waste streams prior to disposal at WCS. Once the evaluation is completed and determined to be adequate, WCS will use the methods employed by the generator to assess whether or not the manifest was properly prepared.

For example, a generator requests to ship a sealed Co-60 point source in the center of a grouted 55 gallon drum and the grout has a density of 2.35 g/cm$^3$ for disposal at the CWF. The source strength of the Co-60 source according to the generator is 47 curies and the total mass of the container is 489 kilograms. The generator determines using a dose-to-curie conversion factor that a dose rate of 93 mrem/hr taken at 1 m from the 55 gallon drum is equivalent to a Co-60 concentration of 96 nCi/g, as specified on the manifest. Using this approach, WCS would confirm the validity of the generator's technical basis and collect a dose rate measurement at 1 m from the 55 gallon drum. If an equivalent dose rate is measured (taking into account the source geometry and measurement uncertainty) by WCS, the concentration of Co-60 listed on the manifest would be confirmed and the waste could be disposed of at the CWF.

After WCS has developed proven track records of consistent and compliant waste shipments from a waste generator, the specified sampling and inspection frequencies may be reduced on a generator and/or waste-specific basis, as approved by TCEQ. Additional waste verification activities will be conducted and documented in accordance with LL-OP-2.7, *Waste Acceptance for Disposal.*

### 6.3.1 Analytical and External Assay Procedures

*Fingerprint Analyses*
Incoming waste shipment samples will be analyzed for the parameters in Table 2. Sample results will be compared to baseline values established during the final step in waste profile approval as described in WAP Section 5.2.4. In lieu of analyzing the incoming waste shipments samples for the radiological analysis listed in Table 2, WCS may elect to analyze the container that was sampled by an appropriate radiological external assay procedure described below in this section. Additional radiochemical analyses including non-gamma emitting nuclides may be performed by an outside laboratory, as determined by WCS, if required for verification of waste classification or characterization.

*External Assay Procedures*

External assay procedures include in-situ gamma spectroscopy, comparison of actual shipment radiological survey data versus expected shipment dose rates modeled from pre-shipment information (e.g., using MicroShield® or other appropriate methods), and the "bonk/slosh" test for the presence of free-standing liquid.

## TABLE 6.3.1
## WASTE VERIFICATION ANALYSIS PARAMETERS

| Parameter and Method | Type of Baseline |
|---|---|
| Free Liquids – (PFLT), SW-846 9095A | Pass/Fail – test must always pass PFLT (qualitative analysis) |
| Density – ASTM D 5057 or equivalent method | Numerical value obtained – results must fall within a given range as set by the profile and pre-shipment sample (quantitative analysis) |
| Reactivity/water compatibility – ASTM D 5058 or equivalent method | Positive/Negative – test must always be negative (qualitative analysis) |
| Cyanide screen – ASTM D 5059 or equivalent method | Positive or Negative – acceptable results may be positive or negative depending upon original analytical results – (qualitative analysis) |
| Sulfide screen – ASTM D 4978 or equivalent method | Positive or Negative – acceptable results may be positive or negative depending upon original analytical results – (qualitative analysis) |
| pH/corrosivity – ASTM D 4980 or equivalent method | Numerical value obtained – results must fall within a given range as set by the profile and pre-shipment sample (quantitative analysis) |
| Flammability Potential Screening- ASTMD 4982 or equivalent method | Positive or Negative – acceptable results may be positive or negative depending upon original analytical results – (qualitative analysis) |
| Gamma Spectroscopy (HASL-300) (if dose rate/activity is within acceptable range of the instrument) | Numerical value obtained – results must fall within a given range as set by the profile and pre-shipment sample (quantitative analysis) |
| Gross alpha-HASL-300 (if dose rate/activity is within acceptable range of the instrument) | Numerical value obtained- results must fall within a given range as set by the profile and pre-shipment sample (qualitative parameter; quantitative analysis) |
| Gross beta- HASL-300 (if dose rate/activity is within acceptable range of the instrument) | Numerical value obtained- results must fall within a given range as set by the profile and pre-shipment sample (qualitative parameter; quantitative analysis) |

Where incoming waste shipments are verified through in-situ gamma spectroscopy, waste containers will be examined in accordance with RS-4.1.4, *Non Destructive In Situ Gamma Spectroscopy*. The gamma spectroscopy results, in combination with generator provided scaling factors, will be used to calculate the activities of significant alpha and beta-emitting components when appropriate and applicable. Results must fall within an expected range developed by review of profile documentation and any pre-shipment sample analysis (quantitative analysis). Typically, in-situ gamma spectroscopy will be performed in designated areas within the staging buildings.

Information the generator provides prior to shipment regarding the waste matrix, radionuclide concentration, package type and count, volume of waste, and transport configuration will be entered into a software program model (e.g., MicroShield®) for all shipments of cask wastes.

This serves two purposes: it assists in RWP planning for receipt and handling of wastes, and the model provides check values for the RST during pre-receipt vehicle surveys. The RST can compare the expected modeled dose rates to the actual dose rates observed during the vehicle survey in the demurrage area defined in the application of RML R04100. This coincides with the examination of shipment by the WAS, allowing the RST and WAS to immediately address any discrepancies between actual and modeled dose rates.

The "bonk/slosh" test is an external procedure that provides information about the potential for free-standing liquids or excessive void space within enclosed containers. This test allows an indirect assessment of these possible conditions for wastes that present an unacceptable health risk to workers who would otherwise have to conduct direct inspections of the waste. This test entails striking the external surface of a container that is not intrusively inspected with a blunt striking device in multiple locations around the container. Each strike should result in a relatively uniform tonal response. If one or more strikes yields a distinctly different tonal response, the container is identified as having a potential moderate or major discrepancy due to the presence of possible liquids or excessive void space, as determined by the WAS. This test is not performed on Cask Waste or High Contact Dose Rate Waste that must be shielded for ALARA purposes. In addition, if a liquid "sloshing" sound is heard while a container is being moved, the container is identified as a probable major discrepancy due to the presence of free-standing liquids.

### 6.3.2 Use of analytical results obtained during the waste acceptance review process

The approved profile distinguishes a range for physical properties along with chemical and radiological constituents for each waste stream, utilizing information supplied by the customer and data generated from pre-shipment samples. The upper and lower boundaries of the ranges are used to verify conformance of received waste to the applicable profile. The range of data used to profile is based on the variability of the process generating the waste, type of analysis used by the generator to characterize and classify the waste, and the variability and uncertainty associated with the results of each analysis. The ranges enforce operational and regulatory bounds to ensure waste is properly classified and is authorized under our license prior to disposal. For example, FWF ranges will not be set that allow a waste stream to vary between Containerized Class A waste and BS or BD waste categories.

Information obtained during the waste acceptance review process is used to verify, but not replace information provided by the generator on the DOT paperwork. The DOT paperwork, including the RCRA manifest, and NRC 540/541 and 741/742 forms, as applicable are considered the official record for waste containers in a shipment. The radionuclide concentrations, RCRA waste codes, etc. listed in these documents will be recorded in the permanent operations log and will be used to track the cumulative source term of the applicable disposal facility.

WCS does not anticipate much variation between analyzed physical or chemical properties within a waste stream and does not expect variation in radionuclides detected; however, it is expected that there may be significant differences between the isotopic activities stated on a manifest when compared to the isotopic activity obtained through verification analysis. If additional radionuclides are detected and confirmed present via analytical validation, WCS will follow the requirements listed in WAP Sections 5.2.1 and 6.1 to determine if these radionuclides

are required to be listed on the WPF and DOT paperwork. If reporting of these radionuclides is not required, then the waste package or shipment will not be considered non-conforming and may be disposed of without additional information from the generator.

Typically, sample collection and analysis (ex-situ analysis) gives a more reliable and accurate result when compared to container screening (in-situ analysis); however, each method has strengths and weaknesses as described below. If the raw data from a specific analysis is out of the profile boundaries for a waste constituent, the review process must take into account the uncertainty and variability of the analysis as there are several factors that can skew results.

*Ex-situ analysis*

Ex-situ quantitative analysis is the most accurate form of analysis but there are limitations to both the sampling techniques used to obtain the analyzed sample and the analysis itself. When obtaining a sample for ex-situ analysis, it is assumed that the targeted analyte(s) is evenly distributed throughout the waste matrix. This may not be the case as there can be "hot spots" or "cold spots" within a container. Non-homogenous waste sampling can lead to results that would cause a particular container or set of containers to be considered non-compliant to the profile. Further sampling and analysis may be warranted to verify whether the original analysis is representative of the contents of the container or shipment as a whole. Matrix interference may mask the presence and concentration of analytes (self-shielding), and saturation of instrumentation from high concentrations of some waste constituents may mask the presence and concentration of other constituents.

The WAS must take all these factors into account when determining compliance for a particular container or shipment. The WAS may request further sampling and analysis and/or input from the waste generator.

Several of the ex-situ analytical methods used by WCS are qualitative, as the results are subjected to a basic pass/fail criteria. Matrix variability can be a factor for consideration in qualitative analysis, but for the most part, if the sample fails one of these tests, the waste is considered non-compliant.

*In-situ Analysis*

WCS utilizes two types of in-situ analysis, dose-to-curie modeling and in-situ gamma spectroscopy. Dose-to-curie modeling is used throughout the commercial nuclear power plant industry to characterize and classify waste streams that are not safe to sample and analyze due to high dose rates. In-situ gamma spectroscopy is frequently used by the DOE to characterize and classify waste streams that are not amenable to sampling such as debris or waste streams that are not safe to sample due to high dose rates.

The technician performing the analysis must have detailed knowledge of both the waste in general and the specific container in question. Information needed is as follows:

- density of the material inside the container,
- attributes of the waste including shielding capabilities within the drum,
- specific packing information such as geometry inside the package,
- homogeneity of the activity within the package, and

- general knowledge of the radionuclides that are present (alpha emitting radionuclides are typically scaled off gamma emitting daughter or parent radionuclides).

The accuracy of this information will have a significant impact on the final results. Assuming the technician has detailed answers to the variables above; the typical uncertainty range for in-situ gamma spectroscopy is around 50%. The uncertainty range for in-situ gamma spectroscopy increases as the accuracy of the information decreases and/or the activity of gamma emitting radionuclides decreases.

WCS may not have detailed information on a drum by drum basis. Each one of these variables must be taken into account when utilizing in-situ analysis to determine overall compliance with a waste profile. This amount of variability will not allow for a "one size fits all" program when analyzing an incoming shipment for compliance with a profile. WCS will rely on the professional expertise of the WAS and/or analysis technician to evaluate the viability and uncertainty of data collected for waste verification to determine conformance with profile conditions.

### 6.3.3 Bulk Soil/Soil-like Waste Verification

All containers (100%) of BS waste will be opened and the contents will be visually inspected. The visual characteristics of the waste will be compared to the WPF information to verify conformance with the waste profile. If the visual characteristics of the incoming waste differ from the WPF information, the discrepancy must be resolved as described in WAP Section 7.0 prior to acceptance of the waste.

At a minimum, the first ten shipments of each BS waste stream will be randomly sampled. Thereafter, if all of the first ten shipments were received without any moderate or major discrepancies, 10% of all future shipments of the BS waste stream will be randomly sampled. In the event that a shipment contains more than one container, the containers will be sampled at a rate of 10% per shipment. Random sampling will be accomplished through the use of a random number generator to identify which of the next ten shipments will be sampled. Where a shipment selected for sampling is composed of more than one bulk container, as in the case of soft-side packaging, the container chosen for sampling will also be selected using a random number generator.

If the first ten shipments of each BS waste stream are not all received without moderate or major discrepancies (see WAP Section 7.0), sampling of all subsequent incoming shipments will continue until ten consecutive shipments have been received without a moderate or major discrepancy.

A QC Sample will be taken at the time of waste placement for the first shipment received. Additional QC samples will be taken on future shipments at the discretion of the Engineering Technician that is visually inspecting each shipment. During the visual inspection step, if the Engineering Technician believes that the soil has changed soil classification or appears to be significantly different from the original pre-shipment sample, a QC sample will be pulled from the shipment. For the purpose of this sample a shipment shall be defined as a single manifested shipment by waste stream. In the event several shipments arrive together (such as with rail shipments) and multiple samples have to be taken across a single shipping event from a single profile, up to 5 like individual samples can be composited into a single sample for analysis. The

samples will be analyzed per ASTM D2487 and ASTM D-698 for verification against the original pre-shipment sample results for that waste stream. The results of this analysis will only be used in the case of a failed soil lift in the IC NCDU. WCS understands that the analytical results from the QC samples may vary from the original pre-shipment sample results. Using operational experience and "skill of the trade", the Engineering Technician will determine how to use the QC sample results as compared to the results of the original pre-shipment sample results. See procedure LL-OP-7.3, *Bulk Waste Compaction Testing* for more detail on soil lift verification protocols.

### 6.3.4 Bulk Debris Verification

One hundred percent (100%) of the containers from each BD waste stream will be visually inspected and Ten (10%) percent of the containers will be subject to external radiological analysis.

### 6.3.5 Containerized Soil/Soil-like Waste Verification

Ten percent (10%) of the containers from each CS waste stream in a shipment will be randomly selected for opening using a random number generator, and the contents will be visually inspected. Each CS waste container that is opened for inspection also will be sampled. Container samples from the same waste profile may be composited prior to analysis, providing the individual samples are physically consistent with the WPF and each other. All unopened containers are visually inspected for container integrity and consistent labeling as described in WAP Section 6.2 and may be subject to the bonk/slosh test for free-standing liquids and void spaces. If a moderate or major discrepancy in waste type is discovered, then the contents of all (100%) of the containers for that shipment are opened and inspected.

### 6.3.6 Containerized Debris Verification

Ten percent (10%) of the containers from each CD waste stream in a shipment will be randomly selected for opening using a random number generator, and the contents will be visually inspected. Containerized debris will not be sampled due to the heterogeneity of these wastes. The same containers of debris that are opened for inspection will be subjected to one of the appropriate external assay procedures described above in WAP Section 6.3.1. All unopened containers are visually inspected for container integrity and consistent labeling as described in WAP Section 6.2 and may be subject to the bonk/slosh test for excessive void space and free-standing liquids. If a moderate or major discrepancy in waste type is discovered, the contents of all (100%) of the containers for that shipment are opened and inspected.

### 6.3.7 High Contact Dose Rate Wastes Verification

Containers with HCD wastes will not be opened at the WCS facilities for inspection or sampling due to ALARA considerations. Ten percent (10%) of the containers from each waste stream in a shipment will be subjected to one of the appropriate external assay procedures and may be subjected to the bonk/slosh test for excessive void space or free-standing liquids as described above in WAP Section 6.3.1.

### 6.3.8 Cask Waste Verification

Due to ALARA considerations, containers shipped in casks and other shielded shipping containers will not be opened at the WCS facilities and will not be removed from their shielding until they have been moved into the designated disposal unit. As such, these wastes will only be subject to verification through input of radiation screening results into a software program model as described above in WAP Section 6.3.1.

### 6.3.9 Large Component Verification

Upon arrival at the WCS Andrews facility, waste receipt and inspection activities will be conducted prior to accepting the LC for disposal. LCs will not be sampled nor will any seals or covers on any openings be disturbed or penetrated as part of the receipt inspection process. The LC-Specific Information Submission required in Section 5.2.5 of this WAP will contain requirements for waste receipt verification.

# 7.0 DISCREPANCY RESOLUTION

Discrepancies may be related to manifests and shipping documents, inspections, and waste analyses or external assays. Discrepancies associated with manifests and shipping documents usually involve missing or incorrect information. Discrepancies associated with inspections may involve damaged containers, containers with free liquids, or obvious differences in waste type. Discrepancies associated with waste analyses or external assays typically involve results that are inconsistent with the baseline criteria established during the waste profile review process for acceptance of shipments of the waste stream.

Any discrepancy between waste profile information, waste analysis or verification results, as applicable, and/or the shipping manifest must be resolved with the generator prior to disposal. Discrepancies that cannot be resolved, present safety issues, or do not comply with regulatory requirements or license conditions may require that the waste be returned to the generator. Shipments with discrepancies may be placed in the demurrage area pending resolution. Containers with free liquids will be shipped from the LLRW disposal facility for treatment or returned to the generator. Leaking or otherwise damaged containers may be managed to facility SOPs, shipped from the LLRW disposal facility for treatment, or the damaged containers or entire shipment may be returned to the generator.

Discrepancies are classified by severity:

1. Minor discrepancies are discrepancies that do not affect the safe and appropriate management of the waste in accordance with license conditions and regulatory requirements, and do not result in a discrepancy between the waste shipment and the waste profile. When minor discrepancies are identified, one to three points shall be assigned to the generator's GCIN number depending on the severity of the discrepancy. If a generator accumulates 9 or more points over a single certification period the generator shall be classified as non-compliant, and shall result in a suspension of the generators GCIN. When several instances of the same discrepancy are identified on a single shipment. The Director of Quality Assurance (Director of QA) and Generator Certification Manager (GC Manager) have the discretion to classify these discrepancies as a single discrepancy or individual discrepancies.
2. Moderate discrepancies are discrepancies that would not normally result in a non-compliance with license conditions but may have minor regulatory impacts (e.g., a waste form that is otherwise complaint with the license and permits and would require a profile modification with minimal impact to operations). When moderate discrepancies are identified, four to six points shall be assigned to the generator's GCIN depending on the severity of the discrepancy. If a generator accumulates 9 or more points over a single certification period the generator shall be classified as non-compliant, and shall result in a suspension of the generators GCIN. When several instances of the same discrepancy are identified on a single shipment. The Director of Quality Assurance and GC Manager have the discretion to classify these discrepancies as a single discrepancy or individual discrepancies.
3. Major discrepancies are discrepancies that could result in a non-compliance with a license conditions and/or regulatory requirement that has the ability to adversely affect members of the general public, site employees, and / or the environment; to include

discrepancies between the characteristics of the shipped waste and the waste profile that are indicative of substantive differences (i.e., wastes that are different in type from that profiled). When major discrepancies are identified, seven to nine points shall be assigned to the generator's GCIN depending on the severity of the discrepancy. If a generator accumulates 9 or more points over a single certification period the generator shall be classified as non-compliant, and shall result in a suspension of the generators GCIN. Major discrepancies could result in rejection of the shipment, classification of the generator as non-compliant, and suspension of the generator's GCIN. If several instances of the same discrepancy are identified on a single shipment The Director of Quality Assurance and GC Manager have the discretion to classify these discrepancies as a single discrepancy or individual discrepancies.