

SECTION 5 OPERATION

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5.0 OPERATION

WCS has established specific procedures for use at both the Compact and Federal Low Level Radioactive Waste Disposal facilities. These procedures represent several departments, including Analytical (LL-AL), Environmental (LL-EV), Emergency (LL-EP), Health and Safety (LL-HS), Operations (LL-OP) which are included as Appendix 5.5, and Radiation Safety (LL-RS), included in Appendix 5.5.2-1. The operations procedures have been separated into distinct activity series;

- Series 1 General
- Series 2 Waste Acceptance
- Series 3 Waste Staging
- Series 4 Waste Sampling
- Series 5 Concrete Canister
- Series 6 Waste Placement Canister
- Series 7 Waste Placement Non-Canister
- Series 8 Interim Cover
- Series 9 Operations Support

The departments, series and individual procedures will be referenced throughout this section of the License Application (LA).

5.1 Waste Receipt, Inspection, and Acceptance

5.1.1 *Types of Radioactive Material*

Describe the types, chemical and physical forms, quantities, classification, and specifications of the radioactive material proposed to be received, possessed, processed, and disposed of at the land disposal facility. The description shall include any prior disposal containing radioactive material at the site. The description shall include performance criteria for form and packaging of the waste or radioactive material that has been previously received and will be received. [THSC §401.112(a)(8)] & [30 TAC §§336.707(6), 305.45(a)(8)(B)(ii)]

Waste to be received at the facility is described in Section 8.2 of this LA, and in Appendix 8.0-1 “Texas Compact Inventory” and Appendix 8.0-2 “Federal Facility Inventory.” The inventory appendices include details on the physical, chemical, and radiological characteristics of the proposed waste streams, additional information includes summaries of waste forms, waste classification (i.e., Class A, B, or C), and generator profile information.

There has been no previous radioactive waste disposal at the proposed WCS LLRW disposal site, although there has been some disposal, as discussed in Section 8.1.2 of certain exempted radioactive materials in an adjacent RCRA subtitle C landfill owned and operated by this applicant.

LLRW is generated from various commercial, industrial, utility, and government operations. Waste forms are similar to industrial solid waste, and range from heterogeneous debris streams, (e.g., decontamination wipes, protective sheeting, contaminated tools) to more homogenous wastes (e.g., specialty sorbents, ion exchange resins, contaminated soil, construction rubble, contaminated structural items).

LLRW is classified by federal and state regulations based on activity of various radioisotopes. The major volume of waste produced by generators is designated Class A, and represents 75% to 90% of the overall volume expected at each proposed facility.

The Compact Waste Facility (CWF) will accept commercial radioactive materials from within Texas and other compact states, and will not accept mixed waste (LLRW that contains hazardous waste under RCRA). Waste receipts over the facility lifetime are estimated to be 2,800,000 cubic feet (102,000 yd³). Historical trending and generator forecasting suggests that approximately 90% of the Compact facility waste volume will be Class A, 9% will be Class B, and approximately 1% will be Class C. All waste will be stabilized prior to placement in the Compact disposal cell using concrete canisters and grout. Large components that will not fit into concrete canisters will be stabilized by the generator prior to transport.

The Federal Waste Facility (FWF) will accept radioactive materials from government facilities and actions, and is expected to accept a combination of wastes that are LLRW and MLLW waste. Federal facility waste volumes are expected to be significantly greater than the compact facility, and the overall disposal cell volume is limited to 3M yd³ (2.3M m³) for the first five years. During License Renewal process the capacity may be expanded to a maximum of 6M yd³ (4.6M m³), as discussed in 30 TAC 336.905.

An alternative disposal approach is proposed for a limited fraction of federal waste for disposal in the FWF-Non Canister Disposal Unit (FWF-NCDU) that possesses inherent structural stability by virtue of the waste form itself. The alternate approach is proposed for soil like and rubble materials from construction demolition, and environmental restoration projects.

Waste identified in Appendix 8.0-2, as meeting the waste form stability requirements will be placed in the FWF-NCDU. The stable waste form requirement eliminates the need for concrete canisters for structural stability. If a waste stream, currently identified as stable and eligible for disposal in the FWF-NCDU, is later determined not to meet the stability requirements it will be placed in the FWF-Canister Disposal Unit (FWF-CDU) along with all other waste forms requiring structural stability. Void spaces within the waste, and between the waste and its package will be reduced to the extent practicable by the generator, prior to acceptance at the LLRW facility.

Waste for the CWF and FWF facilities will be received in a variety of sealed packages. Standard 55-gallon steel drums, cylindrical cask liners, and rectangular steel boxes are common package options for canister waste. FWF-NCDU waste will be received in intermodals, roll offs or other strong tight shipping containers. Examples of common shipping configurations are provided in Table 5-1. While this table provides some general shipping configurations, it is not possible to provide a listing of all possible configurations. The two models of shipping casks listed in Table 5-1, were chosen because the CNS-21-300 has the largest number of casks available for use, and the CNS 8-120B is listed as the most common type B cask. Over 90% of the waste destined for the CWF and 100% of the waste for the FWF could be shipped in a combination of these two

casks. RAMPAC, the DOE website for information on radioactive materials packages, currently lists over 400 types of certified radioactive material packages. Shippers are responsible for preparing safe shipping configurations, considering blocking, bracing and axle weight limits, exposure rates and ensuring all waste transport activities are in compliance with DOT regulations. Generator-designed custom canisters are also expected in a range of sizes for special waste items (i.e., large reactor components).

Table 5-1. Example Incoming Shipment Configurations

Conveyance	Waste Package (s)	Cask Style	Typical Quantity
18 to 40' truck	Intermodal	N/A	1
18 to 40' Flatbed truck	B-25 Boxes	N/A	8
Enclosed Vans	Drums	N/A	80
Truck with Lowboy Trailer	Cask	CNS 21-300	1
Truck with Lowboy Trailer	Cask	CNS 8-120B	1

5.2 Waste Analysis Plan

The applicant shall provide a Waste Analysis Plan which describes [THSC §§ 401.218, 401.225]:

The Waste Acceptance Plan (WAP) proposed for LLRW disposal is based on 30 TAC 336.362(b) and is provided as Appendix 5.2-1. The WAP provides a summary of the waste acceptance criteria for the CWF, FWF-CDU and FWF-NCDU facilities, information on waste analysis and the WCS plan for waste acceptance. Wastes received at the facilities have been divided into six waste stream categories that are used as a basis for the waste analysis and verification program.

The WAP also establishes mechanisms for verification of incoming wastes upon receipt at the WCS facility, including visual inspection for conformance with the Waste Profile Form and shipping manifest, radiological surveys for consistency with modeled external dosages, and, in some circumstances, sampling and radiological analyses in accordance with facility operating procedures.

5.2.1 Waste Acceptance, Classification, and Rejection

The applicant's protocol for waste acceptance, classification, and rejection criteria.

The waste received for disposal at the CWF and FWF facilities must meet all requirements of 30 TAC 336.362(b). The criteria for acceptance of individual waste packages include the following:

- Waste may not be packaged in cardboard or fiberboard boxes.
- Liquid wastes must be solidified.

- Free-standing liquids in waste packages may not exceed 1% by volume, for disposal at the CWF or the FWF-CDU. Waste for disposal at the FWF-NCDU may not exceed 0.5% free-standing liquid by volume.
- Waste must not be readily capable of detonation, explosion, decomposition, or reaction with water.
- Waste must not contain or be capable of generating toxic gases, vapors, or fumes in quantities that would be harmful to workers transporting, handling, or disposing of the waste.
- Waste must not be pyrophoric.
- Gaseous wastes must be packaged at pressures under 1.5 atmospheres and contain no more than 100 curies of activity.
- Hazardous, biological, or pathogenic wastes must be treated to reduce, to the maximum extent practicable, the potential hazard from non-radiological materials.
- All packages must be labeled as Class A, B, or C.

Wastes received at the FWF-NCDU include bulk shipments, received in enclosed DOT shipping containers. Bulk waste receipts will be low activity Class A waste (non-canister) that consists of stable waste forms, as described in Appendix 5.4.1-2, for which WCS is seeking Executive Director approval of alternative practices to meet the requirements of 30 TAC §336.733. Bulk waste consists physically of soil, rubble, and debris. Bulk waste does not contain compactable trash such as PPE, rags, plastic, or other non-stable waste forms. The criteria for acceptance waste materials for disposal in the FWF-NCDU will be evaluated before and verified after transport to WCS, and will include the waste acceptance criteria described above as well as the historical compaction experience for similar types of waste.

Large Components – Waste items for disposal in the Compact facility that are too large to go into canisters will be evaluated on a case-by-case basis, and will required extensive pre planning, which may take several years. Waste items will be expected to meet the structural stability requirements by virtue of their waste character. If they are hollow forms, like tanks or vessels, they will have to be backfilled with sand, waste, or grout to ensure voids are filled. WCS will ensure that every effort is made to remove accessible void spaces in oversized items.

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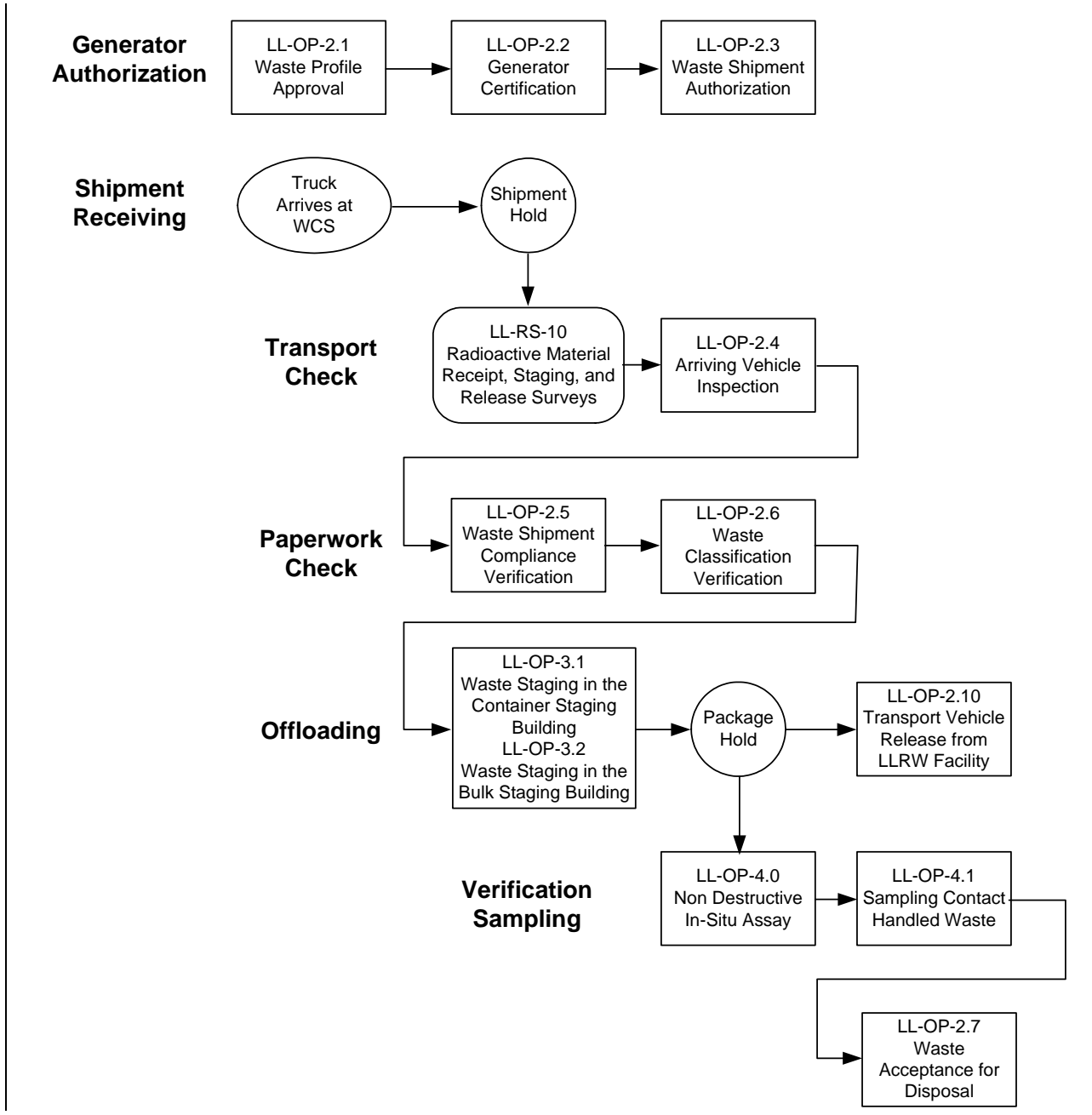


Figure 5-1. Waste Acceptance Flow

The above figure shows the process from the generators initial submittal of a waste profile to the final acceptance of the waste for disposal. All waste will go through this general waste acceptance process, with the exception that waste arriving in shielded shipping casks will not be offloaded but will be direct placement, however it will still complete the waste acceptance process documented in LL-OP-2.7, “Waste Acceptance for Disposal.”

Waste Acceptance – This provides a summary of the WAP, and the details provided in operations procedure series 2, Waste Acceptance, found in Appendix 5.5. The WAP Section 4.0

“Generator and Waste Approval Process” is a multi step process. A detailed review of the waste stream proposed for acceptance is conducted prior to the waste arriving at the WCS LLRW disposal facility.

Generators must be certified and issued a generator identification number, prior to shipping waste to the LLRW disposal facility. Generators shall submit a generator certification package that includes completion of a Waste Profile Form (WPF) that addresses all 30 TAC 336.362(b) criteria, license conditions, and LLRW disposal facility operational and design criteria. The Waste Profile Form is reviewed by and approved by WCS personnel (LL-OP-2.1, “Waste Profile Approval,” Appendix 5.5) to confirm the waste meets all applicable disposal requirements and identifies any special procedures or handling requirements, and if necessary requests the generator provide pre-shipment samples.

Generators that will ship waste that will not be subject to onsite sampling as described in section 4.1 of the WAP are required to undergo a generator site audit (LL-OP-2.2, “Generator Certification,” Appendix 5.5). Once all WPF approvals, pre-shipment samples and generator site audits have been completed as required the generator is issued an identification number, and is eligible to ship waste to the WCS LLRW disposal facilities.

Prior to each shipment of waste a certified generator is required to obtain authorization to ship in writing from WCS, as described in Section 5.1 of the WAP. Pre-shipment authorization (LL-OP-2.3, “Waste Shipment Authorization” Appendix 5.5) requires the generator to submit advance waste manifest for review. This manifest is compared against the approved profile, and any necessary operations requirements are reviewed prior to WCS authorizing the shipment.

Waste Classification –The WAP, Section 2.1, describes the data the waste generators are required to identify the appropriate waste classification according to 30 TAC 336.362(a). Documentation, including the class determination, the relevant radionuclides, and the associated activity concentrations, are provided as part of the Waste Profile Form (WPF) and supporting information. Each WPF will be limited to include only one class of LLRW waste. The mechanisms established in the WAP for review of documentation prior to receipt and review of documentation upon receipt provides for verification of class determinations.

Waste Rejection – Any significant discrepancies, as described in the WAP, Section 6.0, “Discrepancy Resolutions” discovered during the waste receipt inspections must be resolved before the waste can be accepted for disposal. Waste is rejected and returned to the generator if there are discrepancies that cannot be resolved, or if there are safety issues, regulatory violations, or license violations that preclude management on site. WCS will ensure any shipment being returned to a generator meets all applicable DOT requirements.

5.2.2 Analytical/Inspection Process

All analysis and inspection techniques, including any analytical procedures to be used

The WAP, presents the general approach employed by WCS for obtaining, reviewing, and verifying waste information. Table 5-1 summarizes the applicable waste certification and verification steps for the six waste categories described in the WAP. Section 4.2.3, “Pre-Shipment Samples,” of the WAP provides a discussion of pre-shipment samples for certain wastes and applicable analytical methods. Once the waste arrives at WCS, inspections of the

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transport vehicle, waste packages, and radiological surveys will be conducted on all shipments as described in Appendix 5.5, “Procedures and Plans.” Additional inspections or sampling will be completed as described in Section 5.3, of the WAP. Completion of these inspection procedures, radiological verification techniques, and sampling and analytical procedures will be used to establish waste acceptability for disposal. Waste with high radiation fields (greater than 100 mrem/hr), pathogenic hazards, or other occupational risks will not be subject to invasive sampling due to ALARA and other potential health and safety concerns.

Table 5-2. Waste Certification and Verification

	Bulk Soil	Bulk Debris	Container Soil	Container Debris	High Dose Rate	Cask Waste
Generator Certification	X	X	X	X	X	X
Generator Audit	for cause	for cause	for cause	for cause	required	required
Waste Profile Review	X	X	X	X	X	X
Pre-Shipment Sample	X	--	X	--	--	--
Pre-Shipment Authorization	X	X	X	X	X	X
Transportation Survey	X	X	X	X	X	X
Manifest Review	X	X	X	X	X	X
Package integrity & labeling	X	X	X	X	X	X
Package survey	X	X	X	X	X	X
Bonk/Slosh test	--	--	X	X	X	--
Intrusive visual inspection	X	X	X	X	--	--
Intrusive sampling/analysis	X	--	X	--	--	--
Non-Destructive Assay	--	X	--	X	X	--
Survey coupled with Microshield™	--	--	--	--	--	X

Tables 5.2.2-1 through 5.2.2-7 in Appendix 5.2.2, “Waste Stream Classification” include lists for the six waste stream classifications identified in the WAP by generator including the waste media (e.g., filters, metal, sludge, etc.), primary package type, waste class, number of packages and shipments.

5.2.3 *Documentation Review*

A description of how the facility will ensure waste and/or debris arriving at the site matches the waste and/or debris designated on accompanying shipping tickets.

As described above and in Appendix 5.2-1, the WAP, generators must submit a Waste Profile Form (WPF) and supporting information for WCS review and approval before WCS will contract to accept the waste. The WPF package generated under (LL-OP-2.1, “Waste Profile Approval”) provides information on the waste contracted for disposal, and the basis on which it was determined to be acceptable for disposal. This package is used as a reference in subsequent documentation review steps performed by WCS. After the waste arrives at the facility, the Waste Acceptance Specialist (WAS) will complete a “Waste Shipment Compliance Verification” as described in LL-OP-2.5. This is a review of the documentation including the manifest that accompanies the shipment, to ensure the arriving waste matches the information provided in the approved waste profile. If discrepancies are found they will be resolved prior to the waste being accepted for disposal.

5.2.4 *Shipment Rejection*

A description of the specific provisions and actions the applicant will take if the materials do not meet low-level radioactive waste specifications or are improperly processed or packaged.

As noted above, the WAP (Appendix 5.2-1) and facility operating procedures (Appendix 5.5) provide for obtaining, reviewing, and verifying waste information, including inspection procedures, radiological verification techniques, and sampling and analytical procedures that will be used to establish waste acceptability before it can be disposed in the LLRW disposal facility. Any discrepancy between WPF information, waste analysis or verification results, as applicable, and the shipping manifest must be resolved with the generator prior to disposal. Waste materials that do not meet waste acceptance criteria, or are improperly processed or packaged, represent a discrepancy. Waste shipments with a discrepancy will be segregated, as necessary, awaiting resolution of the discrepancy with the generator. The final disposition will be determined based upon the nature of the discrepancy; if the discrepancy can be resolved the waste will then proceed through the waste acceptance process. Discrepancies that cannot be resolved or present a safety or health risk, or violate regulations or license conditions will result in the waste being returned to the generator, following all applicable DOT regulations.

5.2.5 *Waste Characteristics*

Normal characteristics of the waste which must be known in order to store, process, or dispose of the waste and debris; and any abnormal characteristics which may upset further treatment or processing operations.

Wastes will be accepted for disposal only; no storage or processing will be performed at the Federal or Compact facilities. Details on the individual waste streams and waste characteristics that are expected at the CWF are included in Appendix 8.0-1, “Texas Compact Inventory” and in Appendix 8.0-2, “Federal Facility Inventory.” Section 2.0 of the WAP identifies the waste characteristics and waste form requirements that must be met in order for a waste to be

acceptable for disposal. Only waste that has been properly identified and characterized according to the WAP will be accepted at the facilities. Waste that does not meet disposal requirements will either be returned to the generator or forwarded to an off-site facility as directed by the generator.

5.2.6 *Management of Free Liquids*

Methods which the applicant will use to identify and manage free liquids

As noted in Section 2.3 of the WAP, wastes with free-standing liquids in excess of 1% by volume and bulk wastes with freestanding liquids in excess of 0.5% by volume are not accepted for disposal. As part of the WPF information package to be supplied to WCS, the generator must provide supporting documentation used to determine the percent by volume of free-standing liquid. If the generator chooses to meet these criteria using absorbents, WCS requires the waste generator to use twice the amount of non-biodegradable absorbent necessary to absorb the volume of liquid in each container. All information provided by the generator in the WPF package must be certified by the generator attesting to its accuracy, including the information provided regarding freestanding liquids; this information is reviewed for adequacy by WCS prior to contracting to accept the waste. Waste packages will be inspected to confirm the waste is in compliance as described in LL-OP-2.7, "Waste Acceptance for Disposal," and LL-OP-3.1, "Waste Staging in the Container Staging Building."

5.2.7 *Classification Designation*

Methods which the applicant will use to identify and manage the Class A, Class B, Class C, and Containerized Class A wastes.

Waste generators must know the radionuclides and their activity concentrations 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). Section 2.1 of the WAP provides details on the specific radionuclides and approved methods for the generator to obtain activity concentrations. This information is provided as part of the Waste Profile Form approval process. Waste containers and shipments must be accurately labeled as to waste classification at receipt. WCS will confirm the proper classification of all waste shipment as described in LL-OP-2.6, "Waste Class Verification," which also includes details on resolution of any discrepancies found prior to acceptance for disposal.

5.3 Interim Storage, Processing, and Handling of Waste

5.3.1 Land Disposal Facility Operation

Describe the operation of the land disposal facility. The description shall include: methods and areas of waste storage, the procedures for and areas of waste segregation, and facilities for and methods of processing waste including improperly packaged shipments. The description shall also include the methods to be employed in the handling of wastes. [30 TAC §§336.707(5), 305.54(f)]

The discussion below summarizes the staging and handling of waste that is described in operation procedures series 3, Waste Staging, series 4 Sampling and series 9, Operations Support, found in Appendix 5.5 to this LA.

Low-level radioactive wastes designated for either the Federal facility or the Compact facility will be strictly controlled once on the premises to ensure that it is delivered to the proper facility. Transport check-in, weighing, vehicle inspection, and radiological verification surveys will be completed in the common fenced area between the Main LLRW Facilities Gate and the LLRW Disposal Area Gates. Waste packages will remain on the transport vehicle to ensure waste destined for the CWF and FWF will not be co-mingled. These activities will be performed before the transport is directed through the disposal facility gate. The common demurrage area, is located within this fenced area. A general layout of this area is shown on Figure 5-2.

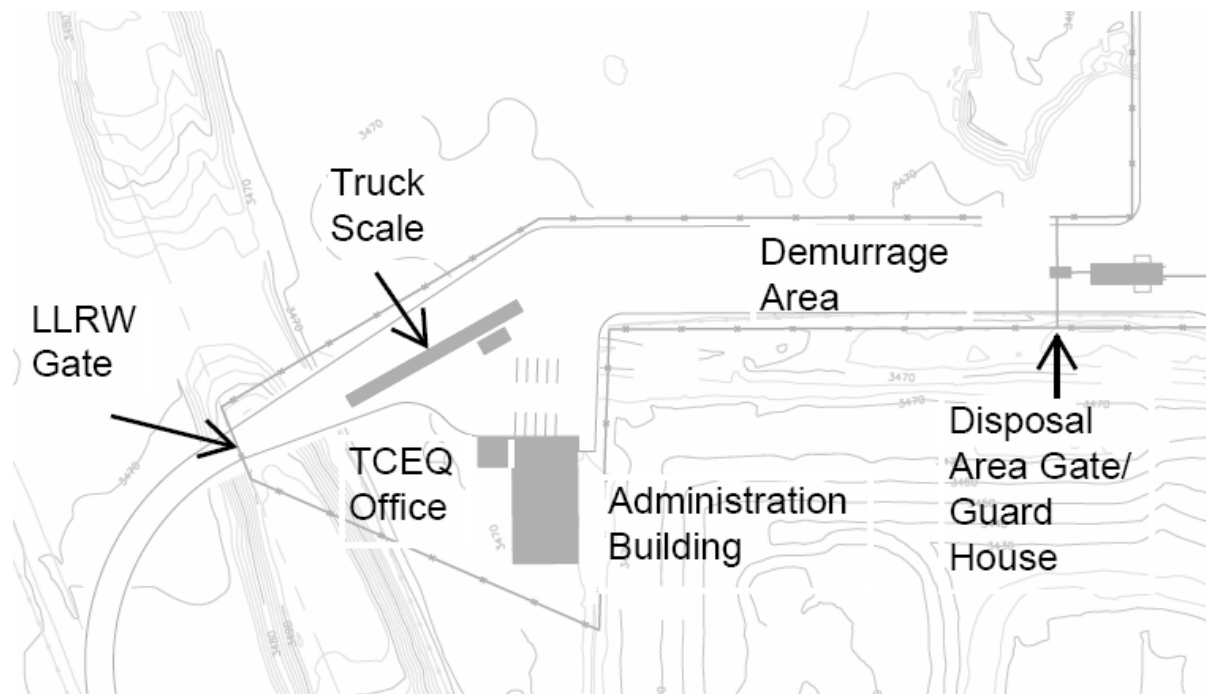


Figure 5-2. LLRW Facility Common Area

The administration building will be Americans with Disabilities Act (ADA)-compliant, and will provide rest rooms, change rooms (including a hygiene shower), general office, administrative space, lunch room, and document/file storage to support both the Federal and Compact facility needs. Attached to the administration building with a covered walkway is a separate building

provided to house the TCEQ resident inspectors. This building has been situated to provide the Resident Inspectors a view of the truck scale. Details on these buildings including floor plans are provided in Appendix 3.0-1, Section 3.3, and Appendix 3.0-2, Drawing A0.02

The LLRW Disposal Area Gates are located at the entrance to the separately enclosed CWF and FWF disposal areas and provides separate and distinct entrances for each. The LLRW Disposal Area Gate building will house communications and first-aid equipment, as well as general storage areas for the use of WCS personnel. While the Disposal Area Gate Building / Guard House does function as a security portal for entry into the disposal facilities, it is not intended to function as a single radiation control point. All radiation control points will be established as directed by LL-RS-5, "Radiological Area Posting," in Appendix 5.5.2-1.

After waste has been preliminarily accepted per LL-OP-2.5, "Waste Shipment Compliance Verification," it will be allowed to move into the specific disposal facility through the disposal area gates. Each of the disposal facilities, have independent areas for waste staging, and assembly of pallets for disposals. No storage or processing of wastes will be performed.

Waste packages with discrepancies may be accepted for disposal if the discrepancies are resolved satisfactorily with the generator. Waste packages with visible physical damage will not be accepted and must be returned to the generator or transferred to an off-site facility as directed by the generator. As necessary, damaged waste packages will be enclosed or placed in overpacks, in accordance with procedure LL-OP-9.6, "Overpacking Waste Containers," found in Appendix 5.5.

Inside each of the respective LLRW disposal facilities are separate operations support areas for offloading and turnaround. Each operations support area includes staging buildings for offloading waste packages and a decontamination building for vehicles and equipment. Waste will be transferred from the waste transport at the staging building using pallet movers, lift trucks, or manual transfer techniques. Floor plans of the individual staging buildings are provided in Appendix 3.0-2 Drawings, A1.02, A2.02, A2.13, A2.14.

Waste arriving at the both the CWF and FWF facilities will be divided into two general groups, contact handled (CH) waste (includes bulk) which is defined as waste packages with a dose rate less than 0.1 rem/hr at 30 cm and remote handled (RH) waste, which has a dose rates above 0.1 rem/hr. at a distance of 30 cm. Remote handled waste that is transported to the LLRW disposal facility in a shipping cask will not be unloaded or handled in the operations support area but will be sent directly to the disposal unit. During normal staging operations, WCS personnel will not come into direct contact with waste, as all waste will remain inside the shipping containers. The only exception to this is when individual CH waste packages and bulk waste packages are opened for sampling or inspection. The Operations Supervisor will control all transport movements using radio-communications equipment (e.g., Motorola two-way radio or equivalent).

Container Waste Staging (CWF & FWF) Shielded waste shipments that arrive in shipping casks will not be staged, all other waste packages will be staged in the container staging building. Details on the unloading of waste packages for waste designated for disposal in the Canister disposal Units (CDU) is provided in Appendix 5.5, LL-OP-3.1, "Waste Staging in the Container Staging Building." The operations supervisor will direct unloading of the waste containers. The staging building has been designed to accommodate various shipment configurations (see

Appendix 3.0-2, Drawings A1.02, and A2.02). The multidirectional design will allow WCS lifting equipment access to flat bed trailers, enclosed vans, and low boy trailers. Routine transfers of waste packages from the receipt vehicle to the raised staging area will be accomplished using dedicated lift trucks (e.g., Toyota “4 ton” forklift or equivalent). Waste drums may be received on shipping pallets so that up to 4 drums can be loaded together, or individual drums may be loaded using a hydraulic lift (e.g., TommyLift™ or equivalent), or drum grappler attachment to a forklift. Waste boxes (e.g., B-25) will be lifted individually by lift truck. The time and motion study provided in Appendix 8.0-4, Attachment B, includes a segment, on drum movement with a forklift. If sampling is required under the WAP, the waste package will be transported into the sampling room. Sampling will be conducted as described in “Non Destructive In-Situ Gamma Spectroscopy” as described in LL-OP-4.0, or LL-OP-4.1, “Sampling Contact Handled Waste,” as applicable to the specific waste package.

Groups of seven drums will be assembled on disposal pallets, to facilitate placement in the concrete canisters. Detail drawing and calculation on these disposal pallets are included in Appendix 5.4.1, “Disposal Facility Operations.” These pallets will be assembled using a forklift with drum grappler attachment, per LL-OP-3.3, “Disposal Pallet Assembly.” Waste packages, and assembled drum pallets will be transferred to WCS stake body or flat bed trucks (e.g., GMC Sierra 3500 or equivalent) for transport to the disposal cell. Reusable strapping will be placed around multiple packages, and each pallet assembly will be secured on the transport vehicle using cinch straps or removable side rails, for transport into the disposal unit.

Bulk Waste Staging (FWF)- Details on the unloading of waste containers for waste designated for disposal in the Non-Canister disposal units is described in LL-OP-3.2, “Waste Staging in the Bulk Staging Building.” Intermodals and lift liners will be offloaded from the transport truck using specialized dedicated lift equipment, such as an intermodal reach stacker, side loader or high capacity lift truck. Waste packages will be moved into the modular sampling enclosures, for visual inspections and sampling if required under the WAP. The type of sampling required for the waste stream may include Non Destructive In-Situ Gamma Spectroscopy as described in LL-OP-4.0, or LL-OP-4.1, “Sampling Contact Handled Waste.”

Spill response and overpacking – In the event that a spill occurs or a damaged waste package is found during staging, WCS will contain the spill/package, and secure the area to limit contamination. Spill response is described in more detail in LL-OP-9.7, “Spill Response,” and the handling and overpacking of damaged waste container is described in LL-OP-9.6, “Handling damaged containers and overpacking.”

On-site generated waste – Operational activities, including waste sampling at the FWF and CWF facilities will result in the generation of on-site waste. This waste will be handled as described in LL-OP-2.8, “Managing On-Site Generated Waste.” Generally, this will include packing at the generation site, labeling, and transporting the waste to the staging building where it will be evaluated following the facility waste acceptance process, then accepted for disposal at the facility where it was generated. If the waste does not meet the facility WAP, it will be packaged and shipped offsite for treatment, under LL-OP-2.9, “Off-site Waste Shipment.” Details on the handling of decontamination water are addressed in LL-OP-9.5. “Decontamination Water Management.” Procedures and administrative controls ensure that waste generated within the Compact facility is buried within the CWF and waste generated within the Federal facility will be buried within the Federal facility.

Waste backlog – Waste receipts will be pre-approved to reduce the potential for backups at the receiving gate. Even with effective planning, temporary backlogs may be unavoidable for various reasons. WCS operations will make decisions as required to avoid backlogs, and to mitigate backlogs from becoming a multiple shift problem.

Table 5.3.1-1 presents a range of operational steps available to address unplanned backlogs, including the initiating event, decision timeframe, and duration of effect. Decision and steps presented in this table can be implemented individually or in combination with other steps. WCS will monitor waste receipt rates and implement appropriate actions to ensure that receipt backlogs are minimized. The decision timeframe is an indication of how quickly the action can be taken in response to an initiating event. The duration value is the maximum length of time that WCS proposes to rely on the action to resolve a backlog-initiating event. As an example, an equipment malfunction is likely to be addressed by a combination of temporary demurrage and the use of substitute on-site equipment while a commercially available substitute is arranged and delivered. Depending on the timeframe required to repair the problematic equipment, a rental unit may not be required.

In the event of a protracted disposal placement delay, WCS will use a combination of these same techniques to manage waste receipts. While not proposed as a general practice, WCS will have the ability to mitigate longer duration delays using staging, as well. Bulk containers can be staged within the FWF-Bulk Staging Building, or on transports in the demurrage area as an additional contingency. Appendix 5.4.1 Attachment A provides a configuration demonstrating bulk receipt can be managed for longer than three weeks should conditions require. WCS does not propose to use extended staging as an operational practice, but the capacity is available to demonstrate how an extended impact could be managed, if necessary. A more practical operations response would be to delay shipments and reschedule receipts, but this action was not included in the onsite capacity analysis.

Packaged waste arriving by transport would also be accommodated by a combination of truck demurrage and container staging inside the FWF and CWF controlled area, should the need arise. Waste receipt rates for the CWF are considerably lower than the FWF, and the staging area in the CWF Container Staging Facility provides more than 10 weeks of capacity, as shown in Appendix 5.4.1, Attachment A. For the FWF, a combination of demurrage and staging could provide more than five weeks of staging capacity. As stated previously, extended staging is neither planned nor preferable to revising shipment authorizations, which can be implemented within a week. The technical basis for on-site staging capacity is intended to demonstrate that WCS can manage in-process transport shipments for several weeks until reductions in shipment authorizations or operational scheduling changes address the temporary backlog.

Table 5-3. Addressing Waste Receipt Backlog

Initiator	Decisions	Decision Timeframe	Time to Implement Response	Duration of Operations Action
Early Transport Arrival(s)	Refuse Shipment	1 day	Immediate	Indefinite
	Demurrage	1 day	Immediate	10 days
	Extend Work Schedule	1 day	Immediate	Indefinite
Equipment Malfunction	Demurrage	1 day	Immediate	10 days
	Substitute WCS Equipment	1 day	<1 day	Indefinite
	Rent Equipment	1 day	<2 days	Indefinite
Weather Delay	Demurrage	1 day	Immediate	10 days
	Extend Work Schedule	1 day	Immediate	Indefinite
	Defer Planned Arrivals	1 day	3-5 days	Indefinite
Problem Package	Demurrage	1 day	Immediate	10 days
	Extend Work Schedule	1 day	Immediate	Indefinite
	Reallocate WCS Staff	1 day	Immediate	Indefinite
Contamination Problem	Demurrage	1 day	Immediate	10 days
	Substitute WCS Equipment	1 day	<1 day	Indefinite
	Rent Equipment	1 day	<2 days	Indefinite
	Reallocate WCS Staff	1 day	Immediate	Indefinite
	Extend Work Schedule	1 day	Immediate	Indefinite
Emergency Condition	Make Safe	Immediately	Immediate	Not Applicable

5.3.2 Flow Diagram

Provide a flow diagram of waste processing and disposal operations and a description and accurate drawings of processing equipment, and any special handling techniques to be employed. [30 TAC §336.708(a)(5)]

Figures 5.3.2-1 and 5.3.2-2, in Appendix 5.3.2, are general operations flow diagrams that illustrate waste handling and disposal for the CWF and FWF. The information is presented as two separate diagrams, one for the CWF and one for the FWF, but most of the steps are identical. Descriptions and drawings of process equipment are not provided as storage or processing of waste will not be conducted at these facilities. Details on special handling techniques and equipment are discussed in Appendix 5.5.2-2, "ALARA Design Features."

5.4 Waste Disposal

5.4.1 *Disposal Facility Operation*

Provide a description of the operation of the land disposal facility. The description shall include waste emplacement; The description shall also include the methods to be employed in the handling and disposal of wastes containing chelating agents or other nonradiological substances that might affect meeting the performance objectives of 30 TAC §336.723. [30 TAC §§336.707(5), 305.54(f)]

The discussion below summarizes the disposal facility operations as detailed in the disposal procedures series 5, Concrete Canister; series 6, Waste Placement Canister; series 7, Waste Placement Non-Canister; series 8.0, Interim Cover; and series 9, Operations Support, found in Appendix 5.5 to this LA. The selection of specific operations equipment will be based on current equipment used for the RCRA facility disposal operations. Separate equipment will be utilized for the Federal and Compact facilities as necessary to control potential contamination pathways.

5.4.1.1 Canister Waste

Waste placed in the CWF and the FWF-CDU will be placed into either circular or rectangular Modular Concrete Canisters (MCC). The circular canisters are designed to hold drums and liners while the rectangular are designed to hold B-25 boxes or other irregular shapes. The waste shipment schedule will be used to plan the number and type of MCC, to be placed. Details on the receipt and acceptance of MCCs are addressed in LL-OP-5.1, "Concrete Canister Receipt/Acceptance" and placement of the empty MCC into the disposal array is addressed in LL-OP-5.2. "Concrete Canister Placement."

The initial layer of MCCs in the FWF CDU will be placed on a precast footing pad, while the initial layer of MCCs in the CWF will be placed on the granular material at the bottom of the cell. In both the FWF-CDU and the CWF the subsequent layers of MCCs will be placed on top of the previous canister. Rectangular canisters will be placed on top of rectangular canisters and cylindrical canisters will be placed on top of cylindrical canisters. The void spaces between the MCCs will be filled with flowable sand. Empty MCCs are placed using a forklift or crane in a staggered nested array with twelve-inch spacing between canisters, described in LL-OP-5.2, "Concrete Canister Placement," and in Figure 5.4.1-3 in Appendix 5.4.1.

Waste packages will be transported to the disposal unit either by WCS trucks, or, in the case of direct disposal waste, commercial transport vehicles. Remote handled waste transported in shipping casks will not be staged but will be directly placed into the disposal cell. The waste will then be offloaded from the transport vehicle, using a crane or forklift with quick release rigging, and lowered into the MCC, as discussed in LL-OP-6.1, "Placement of Contact Handled Waste in Canisters." Additional waste packages will be offloaded until the MCC is full. A temporary cover or lid will be placed by forklift or crane on the MCC until the MCC is grouted.

Waste shipment arriving at the LLRW facility in shielded shipping casks will require additional precautions to ensure radiation doses to workers are maintained ALARA. Appendix 5.5.2-2, "ALARA Design Features," provides a discussion on the ALARA Design of the LLRW facility. Included are examples of commercially available equipment that will be used to support the WCS ALARA goals. Two example cask handling procedures, LL-OP-6.2, "CDU Waste

Placement Cask CNS 21-300 Handling,” and LL-OP-6.3, “CDU Waste Placement Cask CNS 8-120 B Handling” are provided to better illustrate how these waste types may be handled. Over 90% of the waste destined for the CWF and 100% of the waste for the FWF could be shipped in a combination of these two casks. Each model of shipping cask has manufacture-specified handling requirement, restrictions, and inspection requirements. The WCS cask procedures were developed using these requirement as a basis with additional information on WCS specific ALARA considerations. Cask waste shipments will be handled as direct disposal and will not be offloaded or staged, prior to final placement. Where practical, cask activities, such as surveys, and inspections, will be completed before the cask enters the disposal unit or while the cask is in a low dose area. Waste packages in shipping casks are configured during loading so the rigging remains attached to the package, and is easily retrievable once the lid is open. WCS generally intends to lift the waste package from the cask and then immediately place it in the designated MCC. This is intended to limit the time the waste package is unshielded. During that time, all non essential personnel will be directed to move behind a portable shield, or to a low dose area, until the package is in the MCC, and the temporary lid has been placed.

Grout placement into the MCC, LL-OP-6.4,” Grouting and Canister Closure” will be by mobile pumper truck or crane feed hopper, and will generally be accomplished in multiple layers to avoid flotation. Some placement and grouting operations may require special planning for radiation dose control, and additional MCCs are likely to be placed in front of an empty MCC to provide additional shielding for high radiation field waste. Following grouting of the canisters, the next layer of canisters will be placed on top or a prefabricated lid will be placed on top of the canisters. Appendix 5.4.1 Figures 4 and 5 show the completed waste arrays for both the CWF and FWF-CDU facilities.

In addition to the routine disposal of waste described above, WCS anticipates the disposal of non-routine wastes. These non-routine wastes are unusual waste packages, oversized packages or other items that are a one time shipment that cannot be handled under the routine facility operational procedures. In these specifics instances The “Non-Routine Operations” procedure, LL-OP-9.8, would be followed, which described the planning process for the evolution. Planning for such operations includes a formal radiological review, a formal work instruction briefing, and review and approval by the WCS Radiation Safety Officer. At the conclusion of the planning process a specific procedure may be required to be developed and implemented including the use of pre operation mockup for formalizing the agreed upon method. Enhanced line management and radiation safety oversight will be present during the planning and conduct of these operations.

5.4.1.2 Chelating Agents

The chelating agents and other non radiological substances identified in the proposed waste streams in Appendix 8.0-1, and Appendix 8.0-2, do not affect meeting the performance objectives of 30 TAC 336.723. Details on these analyses are provided in Appendix 8.0-7, “Sensitivity and Uncertainty.”

5.4.1.3 Non-Canister Waste

Waste for disposal in the FWF-NCDU will be transported to the disposal unit on WCS trucks. For soil type bulk waste in reusable packaging (intermodals/ roll offs) the truck will be directed

to the unloading area and dumped out of the shipping containers as describe in LL-OP-7.1, “Non-Canister Soil Placement.” The waste will be then be skiploaded to the final disposal location where it will be placed and compacted as described in LL-OP-7.3, “Non-Canister Compaction Testing.” Debris/rubble will be placed in a similar manner as described in LL-OP-7.2, “Non-Canister Debris/Rubble Placement,” but more care will be taken to place the waste so that the overall stability of the disposal unit is assured. Bulk earthmoving equipment will be used for placing, spreading, and compacting bulk materials that meet waste form stability requirements in the FWF-NCDU. A cross section of the filled NCDU is included in Appendix 5.4.1-6.

5.4.1.4 Water Management

There are four categories of water that require management within the CWF and FWF. These are sanitary, non-contact, contact, and laboratory/emergency wash waters. The generation, management, and final disposition of each of these categories are of water are described below.

5.4.1.4.1 Sanitary Water

Sanitary water (gray water) is collected in holding tanks at the Administration Building and the Gate Building/Guardhouse in 15,000-gallon and 1,500-gallon holding tanks, respectively. The water is pumped to a sanitary service truck and removed from the Site as needed. No radioactivity is allowed to be placed in the sanitary water system.

5.4.1.4.2 Non-Contact Water

The term non-contact water is used to mean water that is not contaminated with radioactivity. Non-contact water includes storm water that falls on, moves over, or collects within the CWF and FWF footprint in the following areas:

- Buffer zone including areas around buildings and tanks that are not contaminated
- Non-excavated areas
- Excavated areas under construction
- Disposal cells that have not yet received waste or have been used to hold contact water
- Surface access roads
- All other areas outside the active disposal cells, or outside the cells that have been used for management of contact water
- Storm water that collects within the secondary containment for the 500,000-gallon water storage tanks located in the buffer zones of the CWF and FWF

The above areas are herein referred to as outside of the active disposal cells.

Non-contact water falling outside of the active disposal cells will be managed and discharged in accordance with a WCS Texas Pollutant Discharge Elimination System (TPDES) permit which WCS will apply for and obtain for the management and release of water at the WCS LLRW disposal facility. Non-contact water may also be used for dust suppression anywhere on site, waste or fill material conditioning, or for compaction of stable Class A bulk waste.

Section 3.6 of the LA describes the management of non-contact water in detail. Section 3.6 also includes references to the drainage plans for the CWF and FWF. Storm water that does not fall into the CWF or FWF disposal units drains to areas outside the facilities as shown on Drawings C0.09 and C0.10. These drawings include the WCS Site drainage plans for the CWF and FWF and includes the drainage routes for non-contact water.

During operations, a perimeter berm located upstream from the CWF and FWF will provide diversion control of the water flowing on to the Site. Operational ditches or berms located at the edge of each disposal cell will divert water that falls between the perimeter ditch and the cell opening. Cut ditches are also provided on the embankment side of the internal ledge of an active cell to keep water that falls on the ledge from entering the cell. This non-contact water will be pumped out of the inactive cells to the temporary perimeter berm/ditch as needed for operations. As cells are constructed, they are hydraulically isolated from the areas of waste placement by the use of cell floor berms. These berms are excavated and liner materials placed during initial construction of the cells. The water that falls in these clean, isolated areas is managed as non-contact water.

5.4.1.4.3 Contact Water

Contact water is water that collects within the disposal cells and has contacted exposed waste or the modular concrete canisters or other areas of the disposal cells where waste is being emplaced that may result in radiological or hazardous contamination of the water with radiological or chemical constituents. The term contact water specifically includes the water collected from the following areas:

- Leachate taken out of active or closed disposal cells or taken out of the leachate/storm water collection tanks
- Storm water collected within active cells that have received waste
- Decontamination buildings (includes vehicle, equipment, and container wash water)
- Intermodal (“empty” container) staging pad

Figure 5.4.1-1 shows the disposition and management flow path for contact water. Water collected in the 500,000-gallon water storage tanks will be sampled and managed under the same TPDES permit as the non-contact water. If the sampling data indicates that the water is below the release limits in the TPDES permit, the water may be released to the environment or re-used on site for activities including dust suppression, waste conditioning, or compaction operations. If the water does not meet TPDES limits, the water will be profiled and transported to a treatment, storage, or disposal (TSD) facility in accordance with LL-OP-2.8, “Managing On-Site Generated Waste” and LL-OP-2.9, “Off-Site Shipment of Radioactive Waste.” The management and disposition the contact water from each of the above-listed areas is discussed below.

5.4.1.4.3.1 Storm Water Leachate

Water collected within the active disposal cells will be removed from the disposal cells expeditiously after each storm event to maintain adequate capacity within the collection system and minimize the head on the CWF, FWF-CDU, or FWF-NCDU liners. Pumping rates will typically range from 200 to 600 gallons per minutes. This storm water will typically be removed

by pumping from the leachate collection system sumps in the cell. Other pumps may be used to remove standing water, as described in the water transfer section below. Contact water generated within the disposal cells will be pumped into tanker trucks for use within the cell or transfer to the facility-specific 500,000-gallon contact water/leachate tanks. Contact storm water may be applied to active disposal cells for dust control and, in the case of the FWF-NCDU, compaction operations. Contact storm water may be pumped and applied from a tank truck or from temporary storage vessels or portable holding tanks located in the disposal unit. Procedure LL-OP-9.1, "Dust Suppression," provides the details on how dust suppression water will be applied, including frequency and durations. The contact water/leachate management path is detailed in Figure 5.4.1-1.

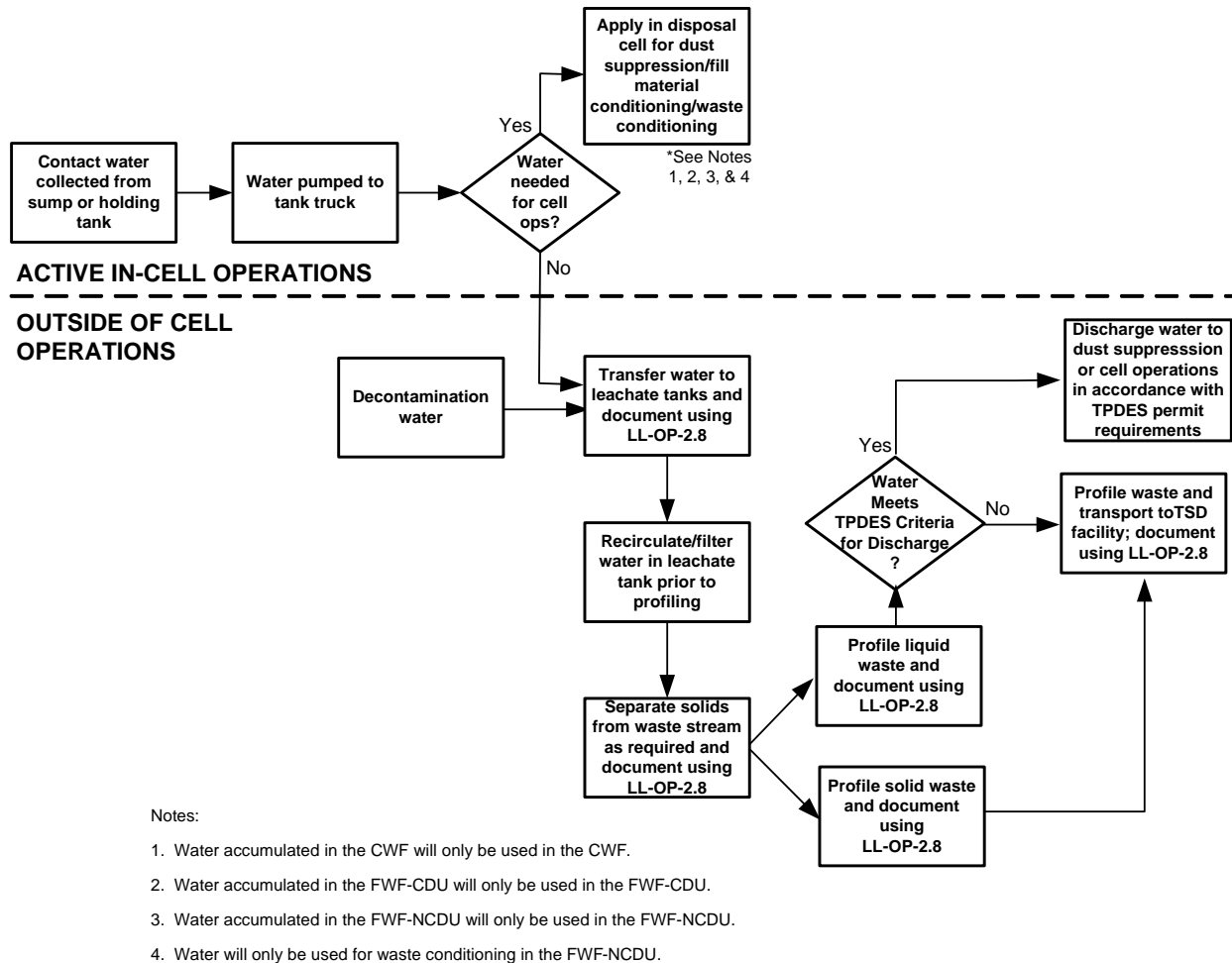


Figure 5-3. Contact Water Management

Water placed in the dedicated CWF, FWF-CDU, or FWF-NCDU 500,000-gallon collection tanks may only be used within the source disposal cells for dust suppression or compaction of fill materials. This water will not require sampling for these uses. Leachate may also be managed in temporary storage vessels within the disposal cells if excess leachate is generated. If excess leachate is to be removed from the landfill, it will be transferred to the leachate collection tanks

and managed in accordance with the WCS TPDES permit and LL-OP-2.8, “Managing On-Site Generated Waste.”

Contact water placed in a tank truck or storage tank will be assumed to be contaminated, therefore the interior of the tank will be treated as contaminated unless a representative sample of the contents are sampled and analyzed and determined to be “clean” (e.g., non-radioactive and non-hazardous). In order for the tank to be considered “clean” for non-contaminated use, a tank that is determined to be contaminated will be triple rinsed or cleaned by another means deemed equivalent prior to returning the tank to service as “clean.”

**5.4.1.4.3.1.1 Leachate Collected from Closed
Disposal Cells**

Leachate from closed disposal cells will be collected from the collection systems in each of the disposal cells via the methods described in Section 3.5.4 and 3.5.5 of Appendix 3.0-1, “Disposal Engineering Report.” Leachate will be transferred to leachate collection tanks using a tank truck. All leachate collection and transfer operations will be documented using LL-OP-2.8, “Managing On-Site Generated Waste.” Commingling of leachate between the leachate collection or storage systems is prohibited.

**5.4.1.4.3.2 Water Collected from the
Intermodal Container Staging Area**

The staging area for decontaminated intermodal containers within the FWF will be constructed with secondary containment to ensure that storm water is captured and analyzed as required prior to release. The water collected from this area may also be collected and transferred directly to a contact water/leachate storage tank prior to final disposition.

5.4.1.4.3.3 Decontamination Water

Each decontamination building (FWF and CWF) is equipped with a 12,000-gallon holding tank that will be connected to a single- or dual-stage pump recirculation and filtration system as described in detail below. Water from decontamination operations will be collected in these respective tanks. Water levels in the holding tank will be managed so that a maximum of approximately 4,000 gallons of water or one-third the capacity of the tank is accumulated and recirculated in a continuous loop-feed operation.

Solids will be removed from the water loop feed stream on a continual basis during operations using the single- or dual-stage recirculating pump/filtration system. This will allow for efficient process water use and minimal water-waste contact time, thereby minimizing the concentration of radionuclides in the water phase. Spent filter socks will be placed in containers that have been pre-loaded with absorbent material to absorb free liquids and the waste containers will be profiled and managed in accordance with procedure LL-OP-2.8, “Managing On-Site Generated Waste.”

Decontamination wastewater will be periodically removed from the decontamination building holding tanks by pumping into a tank truck and transporting this decontamination water to the appropriate FWF-CDU, FWF-NCDU, or CWF 500,000-gallon leachate tanks. The frequency for removal will be dependent on the frequency of decontamination activities and the quality of the

water to be used for decontamination operations. At a minimum, the decontamination holding tanks will be emptied every six months. The Operations Supervisor will determine which of the facility-dedicated leachate tanks are to be used for each load transferred during tank clean out. Excess solids that may require removal during tank cleanout will be placed in containers that have been pre-loaded with absorbent material to absorb any free liquids. The waste containers will be profiled managed in accordance with procedure LL-OP-2.8, "Managing On-Site Generated Waste."

**5.4.1.4.3.4 Laboratory and Emergency
Wastewater**

Laboratory wastewater, consisting of analytical laboratory solutions and wash water, will be collected in a 500-gallon holding tank and pumped to a mobile tank or direct haul truck for shipment off-site to a TSD facility. No liquid waste solutions containing radionuclides will be introduced to, or collected in, the holding tank. No liquid wastes containing radionuclides are expected to be generated on site during laboratory operations. Any liquid waste with the potential to contain, or known to contain radionuclides, will be collected separately for the CWF and FWF and disposed off site at a TSD facility.

Water generated by routine testing and flushing of the eyewash and shower systems with "clean" uncontaminated water may be discharged directly to the sanitary system or to the environment in accordance with the facility TPDES permit. Water generated through emergency use of these systems will be dispositioned on a case-by-case basis and in accordance with the TPDES permit.

**5.4.1.4.3.5 TPDES Permit Requirements for
Discharge**

Water transferred from the disposal cell sumps or temporary holding tanks to the dedicated contact water/leachate collection storage tanks will be sampled and managed in compliance with a TPDES permit. WCS will obtain TPDES permit coverage for the management of contact water including management of the leachate collected from each of the three dedicated leachate collection systems (one per disposal unit) prior to commencing operations, or as guided by the TCEQ Wastewater Permitting Section during the TPDES application process.

The effluent discharge limits and monitoring requirements for radionuclides and non-radionuclides and the wastewater management practices provided in the TPDES permit will be established by the Wastewater Permitting section upon consultation with the Texas Department of State Health Services as specified in 25 TAC 289.101(h)(2). In accordance with 25 TAC 289.101(h)(2), the TPDES permit will not authorize "management activities that are in conflict with state or federal laws or rules relating to regulation of radioactive wastewaters" including 30 TAC 307.4(c) of the Texas Surface Water Quality Standards which incorporates 30 TAC Part 336 by reference, 10 CFR 20.1301, 10 CFR 20.2001(a)(3), and 10 CFR 20.2007. Releases to the environment will comply with the limits in 40 CFR 190.10(a) and the TPDES permit. Water that would not comply with the 40 CFR 190.10(a) limits or the TPDES permit will be shipped off site to a TSD facility for proper management.

**5.4.1.4.4 Water Transfer Operations Using Portable
Water/Leachate Transfer and Filtration System**

WCS will make use of a field portable system for transfer of contact or non-contact water incidental to LLRW disposal operations. This system will be used for water transfer and circulation after transfer to onsite storage tanks. The system includes an engine-driven trash pump discharging through dual fabric filter enclosures, and may be configured for parallel or sequential filtration flow. The system will be assembled from commercially available components, and will include control valves to isolate filter cells for filter media change out, flow configuration, and filtration without the pump. The system will be cart mounted, for ease of transport and setup. The pump and filtration operations are summarized below to demonstrate how the system will be utilized to support operations. More detailed information on the equipment and design specifications are presented in detail in Sections 3.5.4 and 3.5.5 in Appendix 3.0-1.

5.4.1.4.4.1 Pump/Filter System

A high flow, engine-driven open impeller trash pump with a maximum flow rate of 600 gallons per minute (gpm) is proposed for the system to accommodate debris up to 2 in diameter. The pump and filters will be mounted on a wheeled cart that can be manually relocated for use at multiple locations as needed.

Two fabric filter enclosures will be cart mounted to provide discharge side filtration using standard “sock” filters. These cells can be operated using various filter fabric materials to provide filtration to several microns if needed. The sock filters can be removed and replaced in several minutes using no tools.

5.4.1.4.4.2 System Operational Modes

The pump/filter assembly may be operated in various configurations using isolation valves. The pump may be operated without filtration in filter-bypass mode for maximum flow, or may be configured to provide single- or dual-stage filtration. Each configuration may be useful for various operational needs.

5.4.1.4.4.2.1 Filter Bypass Mode

In this mode, the pump is operated without filtration at a near maximum flow rate of 600 gpm. Most transfer or recirculation needs at WCS with this system will be surface transfers, so elevation head effects will be minimal.

Bypass mode will quickly transfer impounded water or leachate to a mobile transfer or contact water/leachate storage tank, and may also be used to ensure effective mixing of storage tank water for sampling. At maximum flowrate, bypass mode will transfer/circulate water volumes as follows:

Table 5-4. Maximum Flowrate

Volume (gal)	Transfer/Recirculation Time (hrs)	Storage Tank Level
500,000	14	Full
375,000	11	$\frac{3}{4}$
250,000	7	$\frac{1}{2}$
125,000	5	$\frac{1}{4}$

5.4.1.4.4.2.2 Single-Stage Filtering

In this mode, the pump is operated with one or both filter cells inline to remove suspended particulates. Flow is dependent on filter loading and resulting pressure head losses, but will range from 200 – 600 gpm. This mode will approach the bypass flow rate when fresh filter socks are installed, but flow will decrease as differential pressure increases with loading. Single stage filtration may be used to provide filtration during transfer operations so that entrained sediment is not carried into storage tanks, or may be used to filter suspended solids within a tank (Figure 5-3).

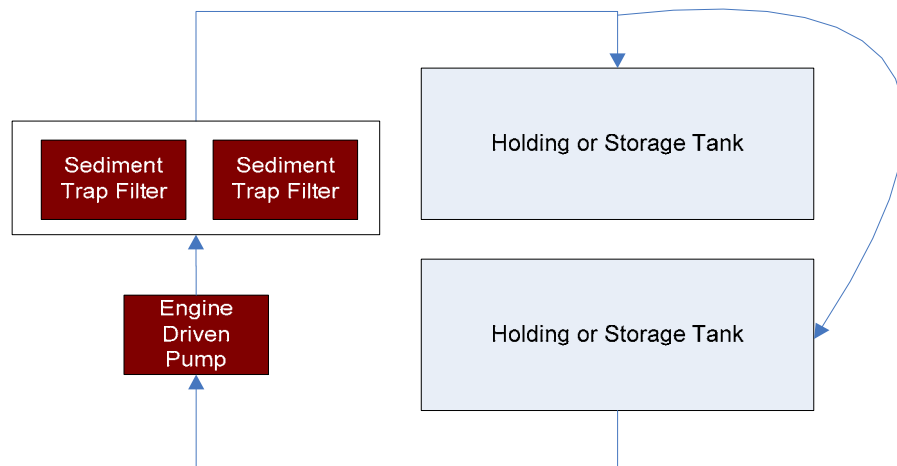


Figure 5-4. Single Stage Filtration

Sediment removal during transfer will simplify haul truck and tank maintenance. Filtration will also be used to remove solids in order to assist with tank decontamination, especially if solids are thought to be contributing to contamination of the water phase. Recirculation times are important to ensure complete mixing of the water in the tank to mobilize the solids in the water stream and also to collect representative samples of the water for analysis. At a nominal flow rate of 250 gpm, single stage filtration will provide the following recirculation times Table 5-5 to provide complete mixing:

Table 5-5. Single Stage Filtration Recirculation Times

Tank Level	Volume (gal)	Recirculation Time (hrs)
Full	500,000	33
$\frac{3}{4}$	375,000	24
$\frac{1}{2}$	250,000	16
$\frac{1}{4}$	125,000	8

5.4.1.4.4.2.3 Dual Stage Filtering

In this mode, the pump is operated with the filter cells in series to remove suspended particulate as a two stage process. This configuration may offer additional filtration effectiveness, or increase in-service times between filter sock replacement. The flow is characteristics of this mode are anticipated to be similar to single stage filtration. Flow rates will range from 200 – 600 gpm. Dual stage filtration may be used to provide filtration after water has been transferred into holding or storage tanks, or an increased level of filtration is desired (e.g., polishing) ().

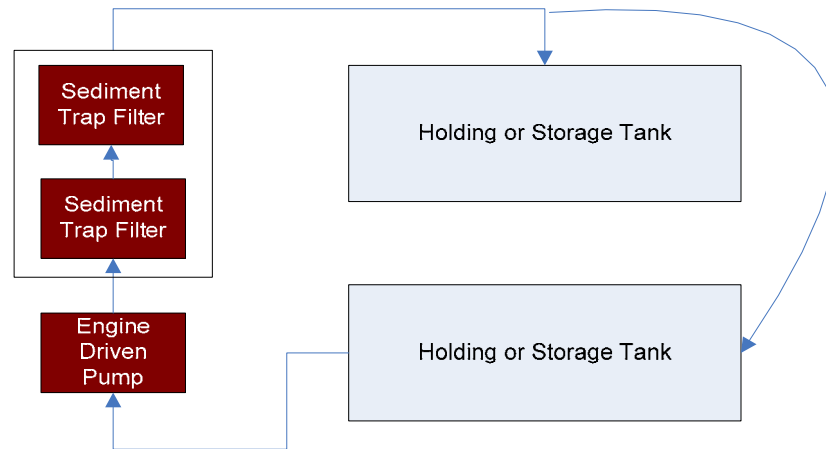


Figure 5-5. Dual Stage Filtration

Sediment removal during transfer will simplify haul truck and tank maintenance. Filtration will also be used to remove solids in order to assist with tank decontamination, especially if solids are thought to be contributing to contamination of the water phase. Recirculation times are important to ensure complete mixing of the water in the tank to mobilize the solids in the water stream and also to collect representative samples of the water for analysis. At a nominal flow rate of 150 gpm, dual-stage filtration will provide the following recirculation times (Table 5-6) to provide complete mixing:

Table 5-6. Dual Stage Filtration Recirculation Times

Tank Level	Volume (gal)	Recirculation Time (hrs)
Full	500,000	55
¾	375,000	42
½	250,000	28
¼	125,000	14

5.4.2 Patterns of Disposal

Provide, for each place of disposal, the volume and rate of disposal of the defined waste, including appropriate averages, the maximum rates of disposal over representative periods of time, and detailed information regarding the patterns of disposal. [30 §TAC 305.45(a)(8)(B)(i)]

For the FWF, calculations assume that the entire 70-year disposal forecast for DOE is received at a constant rate over a 35-year period. Annual volume receipts are forecast at 19,700 yd³/year for the FWF-CDU and 26,400 yd³/yr for the FWF-NCDU. Annual activity receipts are forecast at 470,000 Ci/year for the FWF-CDU and 214 Ci/year for the FWF-NCDU.

Phasing of disposal unit construction is described in Section 4.2, “Construction Methods and Features,” of the LA. Details on the forecasted waste receipts are included in Section 8.2.2. Assuming an average receipt rate, the CWF waste receipt rate is estimated to be 3,000 yd³/yr. For the FWF the entire 70 year DOE disposal forecast is estimated to arrive at the FWF over the 35 year life and have an average annual volume of 46,000 yd³. A considerable fraction of FWF waste is not expected to require placement in concrete canisters, as the waste form itself will provide structural stability. Waste shipments arriving at the facility are inspected, logged, staged, and sampled (if required) before they are disposed. Waste disposal can be organized to support the disposal in the FWF and the CWF corresponding to volume and receipt patterns. Table 5-7 through Table 5-9 demonstrate the patterns of disposal for the CWF, the FWF-CDU and FWF-NCDU.

Table 5-7. CWF Patterns of Disposal

Description	Volume	Units
Bulk Waste	0	yd ³ / month
Packaged Waste	244	yd ³ / month
Modular Concrete Canisters	33	Total / month
Flowable Grout	168	yd ³ / month

Table 5-8. FWF-CDU Patterns of Disposal

Description	Volume	Units
Bulk Waste	NA	Yd ³ / month
Packaged Waste	1,639	Yd ³ / month
Modular Concrete Canisters	150	Total / month
Flowable Grout	1,225	Yd ³ / month

Table 5-9. FWF-NCDU Patterns of Disposal

Description	Volume	Units
Bulk Waste	2198	Yd ³ / month
Packaged Waste	NA	Yd ³ / month
Modular Concrete Canisters	NA	Total / month
Flowable Grout	NA	Yd ³ / month

5.4.3 Waste Segregation

Demonstrate that wastes designated as Class A under 30 TAC §336.362(a) shall be properly segregated from other wastes. This segregation is not necessary for Class A wastes if they meet the stability requirements in 30 TAC §336.362(b)(2). [30 TAC §336.730(a)]

The majority of the waste disposed of in the CWF will be placed in MCCs and will therefore meet the stability requirements of 30 TAC 336.362(b)(2). High activity Class A, B, and C waste will be placed in canisters. Unstable low-activity Class A waste will also be placed in canisters. Large components or other equipment items that are inherently stable based on their waste form or have any voids filled may also be disposed of in the CWF.

The FWF-CDU will receive the same types of wastes as the CWF. Flowable fill material will be placed around the canisters to fill the void spaces between the canisters. The FWF-NCDU will receive Class A wastes that meet stability and radiological requirements for bulk waste within the facility per the Waste Acceptance Plan (Appendix 5.2-1) and Appendix 5.4.1-2 without placement in canisters.

5.4.4 Containerized Waste

Demonstrate that wastes designated as containerized Class A, Class B, or Class C under 30 TAC §336.362(a) shall be disposed of in the following manner:

5.4.4.1 within a reinforced concrete container and within a reinforced concrete barrier, or within containment structures made of materials technologically equivalent or superior to reinforced concrete; [THSC §401.218(b)].

The WCS disposal unit design follows 30 TAC §336.730(b)(1) by providing a containment structure made of reinforced concrete. The containerized disposal units for both the CWF and FWF include a concrete floor, sidewalls and cap, as shown in Figure 3.5.1-1, found in Section 3. Additional details on the disposal unit design are provided in Appendix 3.0-1, "Design Engineering Report."

5.4.4.2 in such a manner that the waste can be monitored and retrieved; [30 TAC §336.730(b)(2)]

Data generated from the leachate collection system, along with operating records, waste manifest data, and sump and tank radionuclide concentration will be evaluated to identify locations in cells where unexpected radionuclide releases could be originating. Details on monitoring are provided in Section 7.2, and in Appendix 7.3.2, "Early Warning and Corrective Action Plan."

As each waste shipment is placed, its location in three dimensions within the cell is recorded. The location information, coupled with the sump monitoring data and settlement data, is a means by which waste performance is monitored. Placing the waste in reinforced concrete canisters and filling internal voids with Controlled Low-Strength Materials (CLSM) grout assures that the waste will be retrievable should the need arise.

5.4.4.3 and, so that the top of the waste is a minimum of five meters below the top surface of the cover or shall be disposed of with intruder barriers that are designed to protect against an inadvertent intrusion for at least 500 years. [30 TAC §336.730(b)(3)]

Waste placement in both the FWF and CWF will be placed within the red bed clay at the Site. The waste will be placed at a level of between 25 and 40 feet below the existing top surface of cover, which is well below the required five meters. In addition to this depth the cover includes a biobarrier as detailed in Figure 3.5.1-1, of Section 3.

5.5 Operations and Safety

5.5.1 Operating and Emergency Procedures Manual

Provide an Operating and Emergency Procedures Manual that provides detailed procedures for receiving, handling, storing, processing, and disposal of waste. Emergency procedures shall include a spill detection and cleanup program for the site and associated transportation of waste. [THSC §§401.112(a) (12), 401.112(a)(16) & [30 TAC §336.707(9)]

WCS' policy is to conduct all of its operations in a manner that ensures all doses are maintained As Low As Reasonably Achievable (ALARA), and protects the health and safety of the general

public and all its employees. Therefore, WCS is fully committed to implementing operations and emergency procedures of the highest quality. Thirty eight operating procedures , fifteen procedures for operational health and safety, eleven environmental, twelve analytical, and one maintenance procedure are provided in Appendix 5.5. A Comprehensive Emergency Plan and implementing procedure, which includes response to spills, radioactive releases, fires, personnel contamination or injury, weather-related incidents, and security incidents, is also provided in Appendix 5.5.

In order to ensure that occupational radiation exposures are maintained ALARA as discussed in Appendix 5.5.2-2, , the following operational practices will be used during waste handling:

- Direct handling of waste will be minimized to the extent practical.
- The time between shipment arrival and waste disposal will be minimized.
- Incoming packages with high radiation levels will be handled expeditiously and remotely as much as possible. Shielding and distance will be used when possible.

Series 1 General (LL-OP-1.x) – The 4 procedures in this series address general operational requirements including hours of operations, reporting and notification, electronic waste tracking and special nuclear material.

Series 2 Waste Acceptance (LL-OP-2.x) – The 10 procedures in this series detail the waste acceptance process, including the initial generator documentation submittal, final waste acceptance for disposal, and associated supporting procedures. A summary of the waste acceptance process is provided in Section 5.2., and Appendix 5.2-1. The handling of onsite generated waste is also addressed, along with the release of the transport vehicle from the facility.

Series 3 Waste Staging (LL-OP-3.x) – The three procedures in this series summarize the staging of both container waste and bulk waste. Staging includes waste shipment offloading; assembly of disposal pallets, and loading of waste for transport into the disposal units. Waste staging operations are described in Section 5.3.

Series 4 Waste Sampling (LL-OP-4.x) – The two procedures in this series provide details on the use of Non-Destructive Testing, and the collection of invasive samples for waste verification.

Series 5 Concrete Canister (LL-OP-5.x) – The two procedures in this series address the receipt, inspection and placement of concrete canisters in the disposal unit. Additional details are included in Appendix 5.4.1.

Series 6 Waste Placement Canister (LL-OP-6.x) – The 4 procedures in this series describe the process by which waste packages are placed into the concrete canisters in both the FWF and CWF facilities, and the grouting and closure of the canister. Waste that arrives on site in shipping casks, and is disposed directly without staging is addressed in the two example cask procedures. A summary of the canister disposal process is provided in Section 5.4.

Series 7 Waste Placement Non-Canister (LL-OP-7.x) – The 3 procedures in this series detail the placement of soil, debris and rubble in the non-canister disposal unit, and the compaction and testing requirements. A summary of the non-canister disposal process is provided in Section 5.4.

Series 8 Interim Cover (LL-OP-8.x) – The single procedure in this series details the placement of the interim cover on the disposal unit.

Series 9 Operations Support (LL-OP-9.x) – The 8 procedures in this series include operations support procedures. Dust suppression, decontamination water management, spill response, and overpacking damaged waste packages are discussed in Section 5.3. The non-routine procedure, and the cask inspection procedure are summarized in Section 5.4.

Decontamination of shipping containers and transport vehicles will be done in the decontamination building, under LL-OP-9.3, “Container Decontamination,” and LL-OP-9.4, “Transport Vehicle Decontamination.” Decontamination will be performed by operations personnel as directed by radiation safety.

Emergency Procedures – LL-EP-1.1, “Emergency Response” is included along with the Emergency Plan (LL-ERP-100) in Appendix 5.5. This procedure provides detailed actions to be taken in the event of a spill. If no threat of off-site individuals or the environment is indicated by the leak or spill, then the cleanup and repair will be accomplished through normal operations procedures.

The Emergency Coordinator will determine whether the spill requires notification to outside emergency organizations.

The Emergency Coordinator will review the waste data information on file. Prior to initiation of spill response, the Emergency Coordinator will determine the required safety equipment for personnel cleaning up the spill and will determine the required response to the spill. If the Emergency Coordinator determines that the spill may pose a threat to off-site individuals or the environment, response and notification procedures to inform others outside of the facility will be initiated in accordance with LL- ERP-100 and LL-EP-1.1.

If a spill occurs, response actions may include (but are not limited to) one or more of the following methods:

- Vacuuming
- Absorption
- Drumming (or overpacking)
- Low-volume water or detergent washing
- Containment by booms, plastic membranes, and berms
- Excavation

When the potential threat to off-site individuals or the environment is controlled, the Emergency Coordinator designates and supervises responsible and knowledgeable individuals to continue the cleanup. This cleanup continues until verified to be within the required limits by the Emergency Coordinator. Waste generated by the response action is packaged or appropriately prepared for disposal in accordance with appropriate operating, health and safety, and radiation protection procedures in Appendices 5.5 and 5.5.2-1.

The Emergency Coordinator is responsible for completing cleanup efforts conducted during and after emergencies. If the release is limited to a hard-surfaced area, the surface will be

decontaminated to the levels specified in the 30 TAC 336.364. In the event of radioactive waste spilling on earthen materials, contaminated soils will be removed to the levels specified in 30 TAC 336.356.

5.5.2 Radiation Safety Program

Provide a description of the radiation safety program for control and monitoring of contamination to personnel, vehicles, equipment, buildings, and the disposal site. Both routine operations and accidents shall be addressed. The program description shall include procedures, instrumentation, facilities, and equipment. [30 TAC §336.707(8)].

It is the policy of WCS to conduct its radiological operations in a manner that ensures the health and safety of all its employees and the general public. In achieving this objective, WCS ensures that radiation exposure to its workers and the public and releases of radioactivity to the environment are maintained below regulatory limits. It is also WCS' policy to further reduce exposures and releases to a level that is as low as reasonably achievable (ALARA). In the implementation of the Radiation Safety Program, WCS will meet all applicable state and federal regulations. Appendix 5.5.2-1, includes the WCS Radiation safety program LL-RSP-100, the associated implementing procedures, details on the radiological support facilities, and information on air samplers and personnel decontamination trailer.

LL-RSP-100, "Radiation Safety Program (RSP)" in Appendix 5.5.2-1 has been implemented to establish provisions for the achievement of a radiation safety program. LL-RSP-100 is a program document that provides the framework to support all radiation safety activities. As detailed in the program, the Radiation Safety Officer is ultimately responsible for all activities involving radioactive materials, with the assistance of radiation safety staff and properly trained operations personnel.

LL-RSP-100 establishes the basis for the radiological controls to be implemented during the performance of work at facilities operating under radioactive materials licenses. Specific Radiation Safety Implementing Procedures have been developed to provide the level of detail necessary to practicably incorporate the requirements set forth in the RSP and are included in Appendix 5.5.2-1. All standard procedures and necessary provisions set forth in the Radiation Safety Procedures manuals are applicable for the disposal facilities. Provisions will be taken to control and monitor contamination of personnel, vehicles, equipment, buildings, and the disposal site to ensure the health and safety of all the employees and the general public.

Personnel involved with the handling of radioactive waste materials will be trained to work safely in and around radiation areas and to maintain their individual radiation exposure, and the radiation exposure of others, to ALARA. Specific training requirements are detailed in Appendix 5.5.2-1 and Appendix 10.4.

Personnel who do not work directly with radioactive waste, but may routinely enter radiation control areas and encounter radiation barriers, postings, or radioactive materials will receive radiation training. This training will be completed prior to potential occupational radiation exposure and includes emergency communication, atomic structure, radioactivity, radioactive material, radiation, radioactive contamination, half-life, airborne radioactivity, types of radiation, sources of radiation, measuring radiation, radiological area classification, biological effects of radiation, radiation effects on the individual, statistical risks from occupational exposures,

pregnant worker training, radiation protection regulations, notice and reports of workers, posting of notices to workers, notification and reports to individuals, consultation and requests for inspection, and ALARA control.

Personnel who work with or who supervise work with radioactive waste or other radioactive materials must receive training in the same topics as listed for general radiation training, but more in depth. Additionally, radiation workers are instructed in the site locations of radiation, shielding, use of dosimeters, dose limits, units of measure for contamination, loose and fixed contamination, units of radioactivity, types of radiation surveys, use of radiation survey, use of radiation survey maps, requirements for entry and exit of radiation controlled areas, requirements for entry and exit of a contamination area, requirements for entry and exit of an airborne radioactivity area, methods for minimization of radioactive waste, and use of anti-contamination clothing and respiratory protection.

Radiation safety technicians receive the same training as radiation workers, but in more depth. Additionally, they are trained in instrument selection, operation, and calibration; instrument surveys; contamination surveys; air sampling; shielding; dose reduction; documentation; decontamination procedures; radiation emergency response; and shipping and receiving radioactive materials.

WCS intends to use Radiation Work Permits (RWP) as an administrative method to control access to waste handling areas. RWPs are issued under LL-RS-1.0, "Radiation Work Permit" and are also used to communicate the access requirements, along with the current radiological information to all persons, working under the permit. Permits are issued for specific tasks, (e.g., waste sampling, disposal operations, tours) and may, at the determination of the ALARA Health Physicist, be issued for specific waste streams as described in LL-OP-2.1, Waste Profile Approval." The RWP documents the specific dosimetry, access requirements and PPE, including respiratory protection, that is required to conduct the activity, and all WCS employees are expected to follow all of the RWP requirements.

All radiological access control points will be established following procedure LL-RS-3.0, "Radiological Area Postings" provided in Appendix 5.5.2-1. Each access control point will include space for the storage of radiation survey equipment, personnel monitoring equipment and contamination control supplies.

Routine monitoring of radiation exposure levels, contamination, and airborne radioactivity will be performed to characterize workplace conditions, to verify the effectiveness of physical design features and engineering and administrative controls, and to identify areas requiring postings. These routine surveys are described in procedure LL-RS-24, "Scheduling of Routine Radiological Surveys"

WCS will monitor for both external and internal radiological exposures. Radiation workers will wear thermoluminescent (TLD), or Optically Stimulated Luminescence (OSL) dosimeters, or other appropriate badges, to monitor for external radiation when in areas that require external dosimetry (LL-RS-15, External Monitoring Program and Dosimetry"). In order to monitor for internal exposure, air monitoring may be performed to estimate and measure the airborne concentrations of licensed radioactive material in the occupied work areas.

Air monitoring and sampling equipment will be used in situations where work activities may result in the release of airborne radioactivity. Air sampling will include both Continuous Air

Monitors (LL-RS-28, "Operation and Use of Continuous Air Monitoring (CAM) Equipment"), along with high and low volume air samplers (LL-RS-26, "Operation and Calibration of Air Monitoring Equipment"). Air Monitors allow for the early detection of airborne radioactivity which could prevent or minimize inhalation of radioactivity by personnel. Where applicable, respiratory protection will be provided under the WCS Health and Safety Program, Procedure LL-HS-10, "Respiratory Protection Program." Bioassays will also be performed as described in LL-RS-17, "Internal Radiation Monitoring and Bioassay Sampling." These bioassays may consist of urinalysis, fecal analysis, or whole-body counting, depending upon the radionuclides for potential exposure.

When handling damaged or defective waste containers, a Radiation Safety Technician will be present to perform external radiation/contamination surveys. The damaged or defective container will be contained to prevent possible spread of contamination. Sheeting will be used as necessary to protect the floor or ground surface. Contaminated materials from the damaged or defective container will be placed inside an overpack container. Any container found to be leaking will immediately be placed in an overpack container, or if that is not possible (e.g., intermodal) place in a configuration to contain and control the leaking material.

Decontamination of vehicles, empty shipping casks, equipment and materials will be done by operations personnel under the supervision of radiation safety, in the Decontamination building for the applicable facility. "Personnel Decontamination" LL-RS-8 will only take place under the supervision of radiation safety in the portable emergency shower trailers provided adjacent to each decontamination building. Attachment D to Appendix 5.5.2-1 provides details on a commercially available portable decontamination trailer. All decontamination areas will have portable radiation meters and equipment to support decontamination activities.

The ALARA philosophy is an important part of the WCS Radiation Safety Program. The "ALARA Program" is described in LL-RS-20, and is supported by LL-RS-21, "ALARA Exposure Data Review." ALARA is not a single step but an ongoing evaluation of facility activities to see how dose can be reduced. The philosophy of ALARA as an ongoing process was also used throughout the facility design process. Appendix 5.5.2-2, provides a summary of the ALARA Design Features of the WCS LLRW disposal facilities. Additionally, it includes examples of commercially available tool and equipment that will be used during operations. After facility construction and as part of the waste profile WCS will have ALARA Health Physicist review every waste profile form prior to approval, to ensure ALARA is considered as part of ongoing facility operations.

The LLRW administration building provides offices for Radiation Safety staff, and general support facilities, including document and file storage. It also provides locker rooms for employees to change from personal attire to WCS provided work-clothing. Details on this building are included in Section 3.3 of Appendix 3.0-1, and Drawings A0.02 to A0.07, in Appendix 3.0-2.

The gate building will function to physically control access to the specific CWF and FWF facilities. It will have space for portable radiological survey equipment, PPE, and other support materials as needed. Adjacent to the gate building is a laboratory building. This building will have designated area to store and control licensed source materials, and storage of other radiations safety equipment and materials. The lab will also function as a counting room for counting smear and other samples in support of the radiation protection program. Details on the

laboratory equipment and storage for portable survey equipment, PPE, and other equipment are shown in Attachment A to Appendix 5.5.2-1.

The container waste staging buildings for both the CWF and FWF are designed with attached sampling rooms. These sampling rooms as described in Section 3.3 of Appendix 3.0-1, provide a negative pressure environment to limit the potential for contamination. The highest potential for personnel to come into direct contact with waste material is during sampling, and the disposal of bulk waste. The bulk waste staging building includes two modular sampling enclosures which will be used for sampling to limit the potential for contamination. The bulk staging building was designed to prevent over the road trucks from coming into direct contact with the WCS trucks that will be entering NCDU. A floor plan of the building is shown in Drawing A2.13 and A2.14 of Appendix 3.0-2.

Each of the disposal facilities has a vehicle decontamination facility. These expanded buildings will also act as radiation protection support facilities. The radiation protection support area includes change areas where staff can don PPE, and pick up respirators, and also will function as a count room allowing radiation safety personnel to count smears, provide storage for portable equipment and includes personnel contamination monitors. The CWF decontamination facility will also include provisions for a respiratory protection wash facility. Details on the buildings are included in Appendix 3.0-1, Drawing A1.08 and A2.08 in Appendix 3.0-2. The radiation protection features are shown in Attachment A of Appendix 5.5.2-1.

5.5.3 Administrative Procedures

Provide a description of the administrative procedures that the applicant must apply to control activities at the land disposal facility, including hours of proposed operation. [30 TAC §336.707(10)]

WCS has included administrative procedures identified as operations series 1 specific to the radioactive waste disposal facilities, in Appendix 5.5. WCS' normal hours of operation are Monday through Friday, 8:00 a.m. to 5:00 p.m. Central Standard Time (CST). Normal receiving hours are Monday through Friday, 8:00 a.m. to 3:00 p.m. CST. WCS maintains additional administrative procedures related to company operations which apply to all employees but are not specific to the LLRW disposal facilities.

5.5.4 Security Plans

Provide the facility's security plans. [THSC §401.112(a)(14)]

The WCS Security Plan (LL-SP-100) and implementing procedures are being withheld from public disclosure pursuant to Texas Government Code, sections 418.177 and .182. The text of that section, including the implementing plan and procedures, is provided in a separate confidential filing.

In general a security fence surrounds the WCS LLRW site. The fence is a seven-foot chain link fence topped with barbwire. The fence prevents unauthorized entry into the facility and outlines the perimeter of a 100-foot operations support area. Access to the disposal facility is controlled primarily through a main LLRW Facilities gate and ultimately through the LLRW disposal area gates. A security station (Gate Building/Guard House) at the disposal area gate controls entrance to the disposal units 24 hours a day, 7 days a week. The CWF and FWF are separated by the

security fence and each facility is accessed through a separate gate. WCS has imposed a system in which all persons admitted into the waste disposal facility are to be issued a badge, whether temporary or permanent. In addition, all vehicles entering the fenced facility must obtain a vehicle I.D. placard. Additional security safeguards are maintained at the main entrance of the complex.

5.6 Mixed Waste

5.6.1 Mixed Waste Classification

Provide plan to comply with the following requirements: All low-level radioactive waste and mixed waste received for disposal by the applicant shall be classified in accordance with 30 TAC §336.362(a), shall meet the applicable characteristics of 30 TAC §336.362(b), and shall be labeled in accordance with 30 TAC §336.362(c).

WCS intends to file an application for a hazardous waste permit in accordance with 30 TAC §335.2. The hazardous waste permit application will seek authorization to dispose of hazardous mixed waste at the FWF only. The application will not seek authorization for storage or processing. The application will be filed in a timely manner so that the processing of the application will proceed on a similar schedule to this application. The RCRA application will not be an amendment of the existing RCRA permit that is in effect for other portions of the WCS complex.

5.6.2 Solid and Hazardous Waste

Provide plan to comply with the following requirements: All low-level radioactive waste and mixed waste received for disposal by the applicant shall be classified in accordance with 30 TAC §336.362(a), shall meet the applicable characteristics of 30 TAC §336.362(b), and shall be labeled in accordance with 30 TAC §336.362(c). [30 TAC §336.733(a)]

The Federal facility will only accept mixed waste for disposal if the waste, as shipped and received, is compliant with all applicable land disposal restrictions (LDR).

5.7 Operational Environmental Monitoring

LLRW operational monitoring will be conducted as a support function under the currently existing “Radiological Environmental Monitoring Program” (REMP) provided as Appendix 2.10.1-2. Two other monitoring programs, “Non-Radiological Monitoring Program” (NREMP) in Appendix 2.10.2-2 and “Ecological Monitoring Program” (EcoMP) in Appendix 11.9.1, are closely tied to the REMP. The environmental series (LL-EV) of procedures specific to the LLRW facilities are provided in Appendix 5.5. These procedures will be implemented as detailed in the proposed monitoring programs provided in Appendices 2.10.1-2, 2.10.2-2 and 11.9.1.

5.7.1 Electronic Record Keeping

Provide a description of the facility electronic record keeping system as required in 30 TAC §336.740(i) (relating to Maintenance of Records and Reports). [30 TAC §336.707(11)]

WCS will use an electronic database for tracking waste at the LLRW facilities. Procedure LL-OP-1.2, "Electronic Waste Tracking System," provides additional details on the electronic waste tracking system. This database will be used for tracking information on the waste profile, the manifest, details on the specific waste packages acceptance, staging, and final disposal. The system will be capable of maintaining and reporting on all records specified by 30 TAC 336.740(i). Once waste packages enter the facility they will be marked with individual bar codes and subsequent movements will then be tracked. Waste packages arriving in a shielded shipping cask will not have a bar coded attached. The final disposal location including specific MCC and location within the disposal array will also be documented. This information will be available electronically for submittal to the Executive Director upon closure or at other intervals as required by the facility license. At a minimum, the reporting fields included in the database will meet the requirements specified in 30 TAC 336.740(f), 30 TAC 336.740(i), and 30 TAC 336.363 Appendix F. Appendix 5.7.1 provides a description of the WasteSoft© system currently being utilized by WCS. This system or its equivalent will be modified to meet the specific LLRW facility requirements.

5.7.2 Operational Monitoring Programs

Provide a description of the operational monitoring programs, including radioactive and chemical characteristics; and plan for taking corrective measures if migration of radionuclides or chemical constituents is indicated. Monitoring data shall be sufficient to evaluate the potential health and environmental impacts during the operation of the facility and to enable the evaluation of long-term effects and the need for mitigative measures. Demonstrate the capability of the monitoring system to provide early warning of releases of radionuclides and chemical constituents before they leave the disposal site boundary. [30 TAC §336.708(a)(10) & [30 TAC §336.731(b)]

The preoperational and operational monitoring programs are described in Appendices 2.10.1-2 (REMP) and 2.10.2-2 (NREMP), and are also presented in Appendix 11.1.1 "Environmental Report," Sections 8.1 and 8.2, respectively. Once operations begin, the preoperational monitoring will transition into the operational monitoring phase. The pre-operational groundwater monitoring program, is presented in Section 6.3 of Appendix 2.6.1, "Geology Report."

With the exception of groundwater monitoring, no significant changes in scope are identified between the preoperational and operational monitoring programs. Additional locations will be added to the operational groundwater system for monitoring of radiological and non-radiological analytes; all other operational monitoring locations, sample media, and analytes, including all procedures and protocols, will remain the same as in the preoperational program, unless a change is warranted by a future review and assessment of the complete preoperational monitoring program. The operational monitoring plan will remain flexible for additional sampling locations or analytical methods as may be appropriate based on operational monitoring results, technical

advances, or other factors. The operational monitoring program will be fully compliant with all licenses, permits and regulations governing the proposed facility.

The objectives of the operational monitoring program are to:

- Demonstrate compliance with applicable environmental and radiation protection standards. The results of sample analysis provide quantitative information that can be compared against environmental and health and safety limits in a continuing demonstration of compliance.
- Obtain data on exposure pathways. The results of sample analysis provide information that can be used to estimate potential doses to the public and to evaluate overall facility performance relative to analyses prescribed in the LA. In essence, the operational monitoring program allows comparisons of site impacts to performance objectives and ensures that environmental impacts are as low as reasonably achievable.
- Provide records for regulatory review. The records from operational monitoring act as the regulatory record that may be used to assess environmental impact and overall performance of the disposal site throughout its life.

To meet these objectives, the operational monitoring program will rely on the information gathered to date as well as the data collected during the preoperational monitoring program. WCS recognizes that the operational monitoring program, as proposed, could change given the eventual review of the data gathered during the preoperational and operational monitoring programs.

Meteorological Monitoring System – Preoperational parameters will continue to be collected and monitored by the on-site station. Regional data collected from selected NOAA stations in the vicinity of the proposed Site will be reviewed and analyzed as required.

Storm Water Management System – Details on the management of storm water is addressed in Section 3.0. Water that falls outside the active excavation areas will be managed as non contact water. This will also include area under construction prior to the placement of waste. The storm water which comes into contact with waste or the active disposal unit will be managed as contact water. The plan is to store and reuse water as needed. Any water will be released under a TPDES permit.

Hydrological Monitoring System – The preoperational groundwater network will be maintained and expanded, as described below. Baker Spring and ephemeral playas may be sampled when water is present.

The operational groundwater monitoring program for the FWF and CWF is presented in Section 6.3 of the Geology Report included as Appendix 2.6.1. As described therein, the proposed operational groundwater monitoring program includes monitoring of the OAG, the 125-foot sandstone, and the 225-foot sandstone, and includes downgradient monitoring locations at an approximate spacing of 600 feet in the 125-foot sandstone and the 225-foot sandstone. The operational radiological groundwater monitoring program for the FWF and the CWF, as described in the current site REMP contained in Appendix 2.10.1-2, will be revised to be consistent with the approved groundwater monitoring program prior to initiation of operations under the LLRW disposal license.

Radiological Monitoring System – The monitoring program will be augmented as required during the operational period, as discussed further in Section 8.2 of the Appendix 11.1.1, “Environmental Report.” This program will be coordinated with the ecological monitoring program to ensure consistency, efficiency, and adequacy.

Further information on the operational monitoring program, including proposed monitoring locations, is provided in Section 5.7.2, in the REMP (Appendix 2.10.1-2), in Section 8.2 of the Environmental Report (Appendix 11.1.1), and, for groundwater, in Section 6.3 of the Geology Report (Appendix 2.6.1). The results of the operational monitoring program will be compared to the preoperational and background data, and the results may require further action as discussed in Appendix 2.10.1-2.

Investigation Limits and Action Limits – Prior to commencing operations, investigation limits (IL) and action limits (AL) will be determined for all active matrix/analyte combinations where the analyte is detected. These actions will require professional judgment due to the influences of analysis volume, matrix effects, and sampling conditions. The description below provides an overview, and cannot address every statistical possibility. Situations outside of those discussed will be evaluated on a case-by-case basis.

At least one year of preoperational data will be evaluated by analyte and matrix. At least one year of data will also be evaluated for seasonal effects. Additional data may be incorporated into the evaluations, as available. A two-tier action level system that provides for appropriate attention to environmental data recognized as above normal background will continue to be used. The first tier is the investigation limit (IL) and the second tier is the action limit (AL). Details of the IL and AL generation are presented in Appendix 2.10.1-2 and Appendix 7.3.2.

Non-Radiological Monitoring – Soil, water, vegetation, and fauna will be sampled and analyzed under Appendix 2.10.2-2. Sampling will generally coincide with REMP sampling campaigns. Analytes, methods and schedules are detailed in Appendix 2.10.2-2. Analytes include volatiles, semi-volatiles, metals, and water-quality parameters. The analyte suites may be modified to correspond to materials received at the proposed land disposal facilities. As with radiological monitoring, the non-radiological program is flexible and may be adjusted to meet operational conditions.

Ecological Monitoring – Flora and fauna data will be included as part of the ecological monitoring program and will be periodically updated. Operations will be reviewed in response to current Federal and State requirements and protection listings. Data from monitoring will be compared with baseline data to discern trends or abrupt changes in important ecological parameters. Additional information on the ecological monitoring program is provided in Appendix 11.9.1.

Corrective Actions – Prescribed actions for operational monitoring variances are described in Appendix 2.10.1-2. The steps provide a logical progression for addressing unplanned situations in the field and laboratory, and may be applied to both radiological and non-radiological analyses. Resampling is not planned for air samples as they represent a lost moment in time. Considering the level of effort required for groundwater sampling, resampling of groundwater is preferred to attempts to bound anomalies by drilling and sampling new locations. WCS retains the decision to install or decommission wells based upon their production and serviceability.

WCS may modify the actions in Appendix 2.10.1-2 as necessary; sampling and analysis anomalies are discussed in the annual radiological and groundwater reports.

Corrective actions are presented in Appendix 7.3.2 “Early Warning and Corrective Action Plan.” This plan is intending for use following verification of anomalous results under Appendix 2.10.1-2.

5.8 Federal Facility Waste

Applications for the licensing of the disposal of federal facility waste shall demonstrate compliance with the provisions of 30 TAC Chapter 336, the Texas Radiation Control Act, and other applicable provisions of the application. The commission may license federal facility waste disposal only at a separate and distinct disposal unit that is operated exclusively for the disposal of federal facility waste and that is adjacent to the compact waste disposal facility. [30 TAC §336.901]

Applicants seeking authorization for disposal of federal facility wastes shall submit:

Sections 5.8.1 through 5.8.5 describe the required submittals for licensing a federal facility waste disposal site.

5.8.1 *Detailed Plans*

Detailed plans for management, control, stabilization, and disposal of federal facility waste and the decommissioning of the licensed federal facility waste disposal activity;

Detailed plans for the management, control, stabilization, and disposal of federal facility waste are provided in various other sections of the LA. Section 3.1.1 provides a description of the general character of the proposed facility, and the disposal cell layout, along with cover systems and water management details. Actual construction of the facility is described and outlined in Section 4.0 of the LA. Operations of the facility are described in this section and include discussion of waste receipt, inspection, and acceptance, waste analysis, disposal operations, and environmental monitoring. Section 6.0 provides details on the decommissioning of the licensed federal facility and eventual dismantling of facilities and closure of the Site.

5.8.2 *Written Agreement*

a written agreement, acceptable to the executive director and signed by the United States secretary of energy, stating that the federal government will assume all right, title, and interest in land and buildings acquired under 30 TAC §336.710 (relating to Institutional Information) for the disposal of federal facility waste, together with requisite rights of access to the land and buildings; [30 TAC§336.909(2)]

Letters related to required arrangements with appropriate State and Federal agencies regarding transfer of ownership are included as Appendix 1.21.1. See Appendix 1.19.2, “Application for Exemption.”

5.8.3 Formal Acknowledgment

formal acknowledgment that the licensee will convey to the federal government the right, title, and interest in federal facility waste located at the federal facility waste disposal facility;

WCS will provide formal acknowledgment that the licensee will convey to the Federal government the right, title, and interest in federal facility waste located on the property conveyed. This will be accomplished following acceptance of WCS to provide the Federal facility.

5.8.4 Detailed Plans for Transfer

detailed plans regarding the transfer of federal facility waste, land, and buildings to the federal government without cost to the state or federal government, other than the administrative and legal costs incurred in making the transfer; and

Letters related to required arrangements with appropriate State and Federal agencies regarding transfer of ownership are included as Appendix 1.21.1. See Appendix 1.19.2, "Application for Exemption."

5.8.5 Signed Statement

a signed statement which indemnifies the state, and its officers and agents, for any liability imposed on the state under state or federal law for damages, removal, or remedial action with respect to the land, the facility, or the waste accepted, stored, or disposed of, because the transfer does not relieve a license holder of liability for any act or omission before or following the transfer. This indemnification does not relieve the license holder of providing financial assurance for decommissioning, institutional control, and, after decommissioning, corrective action. [30 TAC §336.909(5)]

Required indemnification statement is included as Appendix 5.8.5. A signed statement is attached.

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