APPENDIX 7.2.2
INSTITUTIONAL CONTROL PLAN

TABLE OF CONTENTS

LIST OF FIGURES

INSTITUTIONAL CONTROL PLAN

1.0 INTRODUCTION

Once the Compact Waste Facility (CWF), Federal Waste Facility Canister Disposal Unit (FWF-CDU), and the Federal Waste Facility Non-Canister Disposal Unit (FWF-NCDU) have been successfully transferred to the custodial agency (CA), the Institutional Control Period will commence for the facilities. The institutional control activities assume that the site is functioning as designed and estimated to span a 100-year time frame.

The major objectives of post-closure activities are to develop information to demonstrate that the facility continues to satisfy performance objectives and that responsibility for the closed facilities can safely be transferred to the designated custodial agencies. Conditions that must be demonstrated include the following:

- The closure of the disposal site conforms with the Licensee's disposal site closure plan, as amended and approved
- The Licensee has provided reasonable assurance that the performance objectives are likely to continue to be met
- Any funds and necessary records for care are available for transfer to the CA
- The Institutional Control Monitoring Program is operational for implementation by the CA
- The custodial agencies are prepared to assume responsibility and ensure that the institutional requirements will be met

WCS will ensure that the information necessary to transfer the facility to the Institutional Control Period will be complete and accurate. The surveillance and Institutional Control care activities described below will provide the information necessary to make these demonstrations.

The Institutional Control Period provides a means of ensuring the continued safe and effective function of the disposal facilities following facility post-closure activities. Continued activities from the post-closure period are not considered to be active maintenance during the Institutional Control Period. Such activities include surveillance (observation of the disposal site to detect the need for maintenance, evidence of intrusion, and evidence of compliance with regulatory requirements) and site care (repair of fencing, repair or replacement of monitoring equipment, revegetation, minor additions to soil cover, minor repair of disposal unit covers, and general disposal site upkeep, such as landscape maintenance and removal of deep-rooted vegetation).

WCS will coordinate with the TCEQ to determine the times it will prepare and submit applications to terminate its disposal licenses and Treatment, Storage, and Disposal (TSD) permit and to transfer responsibility for the closed and stabilized facilities to the designated Custodial Agency (CA). For the CWF, this time might occur as soon as five years after completion of closure activities, but might be delayed for many more years until confidence exists that the facility characteristics and performance have stabilized and that the facility will continue to satisfy performance objectives. For the FWF facilities, this period is 30 years due to RCRA requirements.

Institutional Control will follow post-closure monitoring, maintenance, and transfer of the facility to the CA.

The costs of conducting Institutional Control surveillance and Institutional Control care activities have been estimated in order to determine what financial assurances are required for the Institutional Control care fund. This costs estimate is located in Appendix 7.2.3.

Descriptions of the plans for carrying out surveillance and Institutional Control care activities for these two closed facilities are presented in the paragraphs that follow.

2.0 SURFACE DRAINAGE AND EROSION PROTECTION

The disposal unit covers are designed to minimize infiltration of water into the disposal unit, to direct percolating or surface water away from disposed waste, and to resist degradation by surface geologic processes and biotic activity. The designs and calculations to support these measures are described below.

2.1 Hydrologic Analysis

The top layer of the final cover system was specifically designed to meet the recommendations of NUREG-1623 for a 1,000 year erosion barrier. The calculations included in Attachment 3.0-3.18 were performed to evaluate the potential for erosion for the native topsoil and sand layers (evapotranspiration cover) directly beneath the erosion barrier, in the event that they are exposed directly to surface precipitation. WCS estimated erosion initially using the USLE deterministic equation but also performed a more complex analysis using the Soil and Water Assessment Tool (SWAT) developed by the USDA Agricultural Research Service at the Grassland, Soil and Water Research Laboratory in Temple, Texas.

Various scenarios were developed and performed in order to account for possible long-term trends of variable meteorological periods. Graphing the normalized cumulative losses, it is calculated that over the first 50,000 years following facility closure, total gravel mulch cover loss due to erosion is calculated by SWAT to be 4.26 inches (0.355 feet). The SWAT calculation is Attachment 3.0-3.29.

2.2 Erosion and Flooding Prevention

To meet the design objectives established by the regulations and standards, the design of erosion protection can be significantly affected by several natural phenomena and consideration of the following was exercised in the design calculations:

- Selection of an appropriate design basis flood or rainfall event
- Control of gully initiation and gully development
- Occurrence of flow concentrations and drainage network development
- Effectiveness of vegetation in arid areas
- Appropriate use of permissible velocity and tractive force methods
- Long-term durability of rock erosion protection

Erosion protection was calculated using the shear stress (tractive force) methods as prescribed in NUREG-1623, *Design of Erosion Protection for Long-Term Stabilization*. This calculation is provided in Appendix 3.0-3.14 and presents the requirement for the top layer of the final cover to minimize long-term water erosion. The steepness of slope, the length of slope, and the rainfall intensity were the controlling factors for the tractive force method. The maximum calculated rainfall intensity was chosen to provide the most conservative solution. The slopes were chosen for their steepness, length, and the combination of steepness and length. The calculations concluded that a 1-1/2-inch layer of 1-1/2-inch minus, uniformly graded gravel mulch placed as the top layer of the final cover exceeds the requirements in NUREG-1623 to provide a protection from water erosion.

Also, WCS performed an assessment of erosion at the LLRW disposal site. It has been determined that the site currently has stable topsoil and that the site is aggrading and generally speaking erosion is not an active process on the site (see Appendix 6.4-3 of Appendix 2.6-1).

2.3 Disposal Unit Final Site Grading

The final site contours following closure of the facility will not look much different from the initial site before excavation and construction occurs, except that contours will be regraded to ensure that overland flow of water is directed away from the disposal site without erosion. The Finished Site Grading Plan is provided in Drawing C0.11 of the License Application (LA). Longitudinal and cross sections of the Institutional Control FWF Disposal Unit are provided in Drawings C2.6 and C2.6A. Longitudinal and cross sections of the Institutional Control CWF Disposal Unit are provided in Drawings C1.6 and C1.6A.

2.4 Peak Flood Calculations

The peak flood calculation used to determine the maximum rainfall intensity was performed in the Final Cover calculation package found in Appendix 3.0-3.14. A PMP storm was used to produce a corresponding rainfall intensity of 10.54 inches. This value was used in determining the gradation and size of the gravel mulch specified in the calculation package. Given the final slope of the site and the gradation of the gravel mulch, velocities of flooding effects will be low enough to prevent erosion of the final cover, thereby maintaining the constraint to minimize active maintenance on site.

3.0 GEOTECHNICAL STABILITY

Information on the geotechnical stability aspects of the institutional control plan are provided in this section in accordance with 30 TAC 336 performance objectives and technical requirements. Information is provided on the design and construction of the disposal unit cover systems, overall site cover, and related monitoring program.

The facility is designed for long-term stability and to prevent inadvertent intrusion. Because the design incorporates a cover ranging in thickness from 25 feet to 45 feet, designed conditions will favor waste isolation. An additional design feature is the inclusion of long-term volumetric stability of the waste array by the use of concrete canisters, controlled low-strength material (CLSM) grout, and reserve red bed fill material in the cover system. These components will provide additional assurance that active maintenance will not be required after facility closure. Modular concrete canisters will be used for waste that may degrade with time, and all accessible

voids will be filled by flowable fill grout as these waste packages are placed for disposal. Each waste layer will also have flowable sand fill designed to ensure uniform and minimal settlement, and to direct water away from the waste array. The cover system will also have a reserve volume of compacted clay that will be capable of reforming and flowing to close any fractures or cracks that could develop, even though the potential for such failures are likely to be mitigated by other design elements.

Both passive and active design features will be used to protect the inadvertent intruder. A fence will be constructed around the facility to prevent intrusion. Durable markers will also be used to alert potential intruders that the Site contains radioactive waste, and to delineate the extent of the subsurface waste array. These markers will be located at each corner of the disposal unit and at each corner of the buffer area. These features are intended to alert the casual intruder of the previous activities at the Site.

The incorporation of a reinforced concrete header above the topmost layer of canisters in the CWF also serves as an indication of human activity. While the grout in both the FWF and CWF may pose a minimal challenge for drilling equipment, the presence of visibly alternating layers that can be readily identified from the red bed clay host formation will be a reliable indicator. The waste matrix itself should provide a similar indication for most waste streams as well.

The final cover will be vegetated with locally hardy grasses, such as Side Oats Grama, Switchgrass, Blue Grama, Plains Bristlegrass, Sand Dropseed, Buffalo grass, or similar varieties. For further description of the site flora refer to the Ecological Assessment (Appendix 2.9.1). Deep-rooted plants will be controlled throughout post-closure and institutional control to maintain the proper vegetative cover, and supplemental watering will be used to establish initial vegetative species so that undesirable species are thwarted during the initial decade of post-closure.

The detailed element of the disposal unit cover system is outlined below:

3.1 Disposal Unit Cover System

The Disposal Unit Cover system is an optimal design to provide the best assurance to meet performance objectives of the regulation. The cover system consists of a shotcrete layer, an interim cover of clay fill, the performance cover, a lateral drainage layer, a leveling fill, biobarrier, and evapotranspiration cover. The design computations for all elements of the cover system are found in Attachment 3.0-3 of the LA. The construction of all features of the cover system and other appurtenances including the leachate collection system are contained in Section 4, Construction, of the LA. Lift thicknesses, degree of compaction, moisture content, and other required specifications for each cover system and associated elements are referenced in Appendix 4.2.3 of the LA.

4.0 INSTITUTIONAL CONTROL MONITORING

This section provides a description of the Institutional Control Monitoring Plan, including radioactive and chemical characteristics, and a plan for taking corrective measures if migration of radionuclides or chemical constituents is suspected.

As shown in the figure below, WCS will employ several different monitoring plans that will be in effect at different periods of time. Elements of the closure monitoring program are outlined in Appendix 6.1.2-1 and discussed in this section.

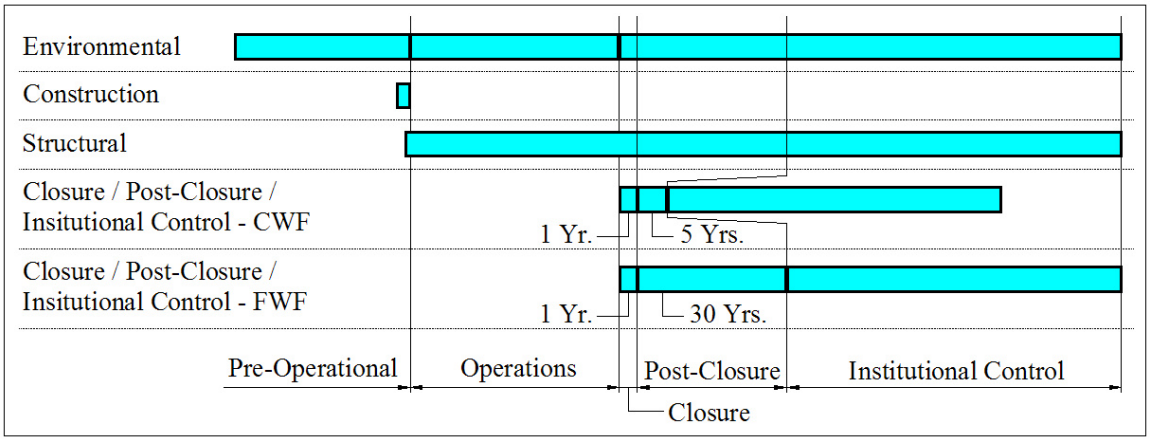

Figure 7.2.2-1. Timeline of Monitoring Plans

The following list shows where the monitoring plans above can be found in the LA.

- Environmental Monitoring Plans – Appendix 2.10.1-2, Appendix 2.10.2-2
- Construction Monitoring Plan – Section 4.4
- Structural Monitoring Plan – Appendix 4.4-1
- Closure Monitoring – Appendix 6.1.2-1
- Post-Closure Monitoring – Appendix 7.1.1
    - Institutional Control Monitoring – Appendix 7.2.2

During the Institutional Control Period, certain items will be monitored. Monitoring of non-environmental items such as settlement of the final cover and exterior fence integrity are part of the program given in this section, while monitoring of environmental items are addressed in other appendices. The Radiological Environmental Monitoring Plan is given as Appendix 2.10.1-2, and the Non-Radiological Environmental Monitoring Plan is given as Appendix 2.10.2-2. By having these monitoring programs in place and following them, WCS and the CA will generate the data necessary to demonstrate that the site has not failed and will not fail during the period of institutional control and into the long-term.

Planned locations for environmental monitoring during the Institutional Control Period locations are identified in Appendix 2.10.1-2 (see also Section 6.3 of Appendix 2.6.1). Planned matrices and analyses are identified in Appendices 2.10.1-2 and 2.10.2-2. The institutional control radiological groundwater monitoring program for the Federal and Compact facilities, 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. The proposed monitoring locations for the Institutional Control Period may be adjusted as appropriate based on the results of the ongoing operational monitoring program and as authorized by TCEQ.

The frequency of sampling and extent of laboratory analyses may be reduced during the Institutional Control Period as approved by the TCEQ based on the extent that monitoring data confirms that the Site and facilities are performing as projected and as required. The CA will continue to monitor in such a way as to ensure that any migration of radioactive or hazardous constituents or any unexpected behavior of environmental media will be detected. In the event that such changes are detected, the sampling frequency and extent of laboratory analyses can be modified as deemed appropriate.

Groundwater monitoring will continue to provide data to support long-term impact evaluation. In addition, if water is present, the surface water at Baker Spring may continue to be sampled as part of Station 23-TW. A background sample will be collected and analyzed with each round of sampling.

Soil and vegetation will continue to be sampled through the off-site environmental indicator measurements. The sampling methods and laboratory analyses will be unchanged. A matrix background sample will be collected and analyzed with each round of sampling. Air sampling methods and laboratory analyses will also remain unchanged, although methods may be technologically upgraded based on industry standards.

External gamma radiation levels will continue to be measured and recorded using thermoluminescent dosimeters (TLDs) and survey meter mapping. The TLDs are located throughout the area as listed on Table 2.10.1-3 in Section 2. The control station (Station 9) will continue to provide background information. The TLDs will be collected and processed quarterly along with a set of control TLDs. The on-site grid system used during operations for micro-R surveys will continue to be used during the Institutional Control Period. Radon levels will also be monitored during the post-closure period.

4.1 Surveillance Monitoring

4.1.1 Surveillance

Surveillance is observation of the disposal Site for purposes of visually detecting the need for maintenance, institutional control care, evidence of intrusion, and evidence of compliance with other license and regulatory requirements. During the Institutional Control Period, appropriate surveillance activities will continue to ensure that these objectives are met, as described in the following paragraphs.

4.1.2 Physical Surveillance

Physical surveillance will be conducted periodically during the Institutional Control Period. The Site will be physically inspected for needed maintenance and repairs performed to maintain integrity of the waste and safety for the institutional control work force. This includes inspection of remaining facilities, fences, landfill cap and monitoring for erosion by water or wind.

As described in Section 7.3.2, the CA will maintain surveillance over and provide institutional control care of the closed Site and facilities during the Institutional Control Period to determine whether the Site and facilities are performing as projected and whether active maintenance is required. The program relies on information gathered from the preoperational and operational monitoring programs to provide a baseline of natural Site and disposal unit performance characteristics. It is designed to be flexible to incorporate information from preoperational, operational, and post-closure data.

4.1.3 Periodic Walkover Inspections

During the institutional control time frame periodic walkover inspections will be conducted of the facilities on a semi-annual basis to ensure that no conditions are encountered that indicate a need for more intense surveillance. Walkover inspections are estimated to occur on a monthly basis throughout the Institutional Control Period but could be revised and amended if evidence reveals that the frequency is too little or too much.

The purpose of these walkover inspections is to identify processes and conditions that are not as planned or that could compromise the ability of the closed facility to continue to meet performance objectives. During these inspections, the following characteristics and conditions will be examined:

- Evidence of subsidence, settlement, and differential settlement
- Evidence of wind or water erosion
- Evidence of biotic intrusion activity, such as burrowing and establishment of deep-rooted vegetation
- Evidence of other intrusive activities, including inadvertent intruders
- Integrity of perimeter fencing

These periodic walkover inspections will use instructions and data sheets that will prescribe the course to be followed, the examinations to be made, the evidence to be collected, and the observations to be recorded. Among the evidence to be collected will be photographs of prescribed and other locations and features, physical measurements, and examinations of results of the various components of the Post-Closure Monitoring Program.

4.1.4 Interpretation of Surveillance Results

All data, information, photographs, records, monitoring results, and other information gathered by surveillance activities will be consolidated. The resulting database will be used to support analyses and evaluation of observed Site conditions and processes. Each year during the Institutional Control Period, an annual surveillance report will be prepared that presents and justifies a comprehensive portrayal of conditions at the closed facilities and the extent to which assurance is accumulating that performance objectives are likely to continue to be met. The annual surveillance report will also identify revisions to surveillance activities needed to better monitor the facilities' closed conditions.

4.2 Structural Monitoring

The Structural Performance Monitoring Plan (SPMP), given as Appendix 4.4-1, contains specific information on the structural monitoring activities that will occur during the post-closure period. The SPMP spans the Closure, Post-Closure, and Institutional Control Periods, and is mentioned only briefly here.

4.2.1 Settlement Monitoring

The final cover placed over the disposal unit cells using industry standard and approved survey methods each year following facility closure for both the CWF and FWF will be examined. The surveys of topography and settlement monitors will be used to determine the extent to which any subsidence may have occurred and whether further investigation or active maintenance is required. Institutional Control of the CWF was assumed following post-closure monitoring, maintenance, and transfer of the facility to the CA.

For FWF, the 30-year period for land surveys may be followed by an additional Institutional Control Period. As necessary, during any extended period, the CA will continue conducting these land surveys every month until the license and permit have been terminated and/or responsibility transferred to the designated CA.

Settlement monitors are placed in the center of each phased cell as shown in Drawing C0.4 and the settlement monitor construction details are found in Drawing C0.13.

4.2.2 In-Situ Sensors

During operations in-situ sensors (strain gauges) will be installed in the concrete barrier. These sensors will be monitored during operations, closure, and Institutional Control activities to obtain a level of confidence that the site is performing as designed. The duration and frequency of monitoring in-situ devices is described in the Structural Performance Monitoring Plan, Appendix 4.4-1. Since the life expectancy of these sensors is not completely known, if the sensors fail it may be impractical to replace them.

4.3 Infiltration Monitoring

4.3.1 Leak Detection Monitoring

As a further safeguard at the FWF, the CA may continue to monitor performance of the leak detection system. If so, the CA will monitor and record the volume of liquid (if any) removed from each Leak Detection System in the FWF according to the following schedule:

- As may be required, during the Institutional Control Period, as long as the liquid levels in sumps remain below the pump operating levels for at least two consecutive monitoring periods

If, at any time during the Institutional Control Period, the pump operating level is exceeded, the monitoring returns immediately to monthly recording of amounts of liquids removed from that sump until the liquid level again stays below the pump operating level for two consecutive months.

The designed leachate collection system for the FWF and CWF disposal units are shown on Drawings C1.10, C1.11, C1.12, C2.22, and C2.23 in Appendix 3.0-3. The design for the FWF disposal unit incorporates a large diameter leachate collection pipe from which leachate water (if present) can be pumped. The large diameter pipe allows pumps to be placed relatively easy and inhibit clogging. This high-density polyethylene pipe will be resistant to chemical constituents within the waste matrix. There is also a separate leachate collection system designed to detect leachate under the waste disposal unit. This is due to the RCRA double containment system required. The CWF disposal unit doe not require a double-lined system and therefore has only a leachate detection/collection pipe from which monitoring and collection will be achieved. Specifications for pipe, embedment, equipment, materials, and their respective installation and inspection requirements are contained in the construction specifications found in Appendix 4.2.3.

The potential for contaminated leachate to be present following closure of the facility is very small, but monitored will still take place to detect it. If contaminated leachate is discovered in the collection sumps of the disposal cells during routine scheduled monitoring after final site closure, it will be sampled and analyzed for radionuclides to determine the disposition. The water will then be pumped into a tanker truck and disposed off-site based on the sample results. All leachate pumped after final site closure will be transported off-site for disposal.

For further information about the leak detection system and the leachate collection system and applicable regulations, see Section 6.2 of this appendix.

Also, the vadose (unsaturated) zone under the disposal cells will be monitored for excessive moisture. If a saturated condition is observed in an isolated area, it could indicate a leak. Plans to monitor the vadose zone are contained in the Structural Performance Monitoring Plan, Appendix 4.4-1.

4.3.2 Groundwater Monitoring

Groundwater is the most likely pathway for human exposure for contaminants in the FWF and CWF. Groundwater analysis can provide early warning of contaminant migration before it reaches the site boundary. Groundwater wells are located within the site boundary and will provide early warning before the groundwater could potentially exit the disposal site property boundary.

The leachate collection and analysis program described in Section 5.3.4 coupled with the groundwater monitoring system will provide data to determine the source and nature of the contaminants. The specific isotopes and concentrations identified in the groundwater or the leachate collection system will provide a basis for reviewing waste inventory locations in order to identify areas where more detailed sampling and analyses and cover inspections should be conducted.

4.4 Database Tracking and Data Analysis

The CA will continue to use the database system it developed and used during operations throughout the Institutional Control Period. Moreover, these data and all associated records will be maintained as required following closure to enable research and investigation. This approach to record keeping will ensure that all information relevant to the performance of the Site and facilities will be retained and available as required to support continuing review and evaluation.

The CA will periodically review and verify all environmental data collected under the various stages of its monitoring programs. The purposes of such review will be to identify the need for changes, whether involving revisions to the monitoring programs or corrective actions to address unacceptable or undesirable conditions. Date verification will ensure the accuracy of the results and may include recalculation of the results, comparison of the results from replicate samples, review of quality control used for sampling, other analyses, and/or comparison to other parametric analyses. Following verification, the significance of the sample results usually will be assessed to determine the need for corrective action.

As data are collected, the CA will perform trend analyses and report findings to the TCEQ, as required. Trend analyses will consist of statistical evaluations of subsets of the data to determine the extent to which the data are within the background/baseline population. The trend analysis will also include interpretation of the data and analyses based on a standard environmental statistical approach.

4.5 Radiological and Chemical Waste Characteristics

The detailed radiological and chemical waste characteristics will be documented in detail at site closure. Estimates of the waste inventories and characteristics at the beginning of the site development are found in Appendices 8.0-1 and 8.0-2.

4.6 Detection Monitoring Program

Data analysis and response will be managed through the environmental monitoring plans included in Appendices 2.10.1-2 and 2.10.2-2 of the LA. The detection monitoring program establishes the methods to be used to determine whether there is statistically significant evidence of contamination for any parameter monitored for at the monitoring location. Detection monitoring does not include the investigation phase that will be conducted if statistically significant evidence is found that a release has occurred from the disposal site. Should a release occur, then the substantive requirements of 30 TAC 335 will be met and corrective action initiated.

The statistical methods for monitoring data evaluation are described in Section 5.1.5.1 of Appendix 7.3.2, “Early Warning and Corrective Action Plan.”

5.0 EARLY WARNING RELEASE FEATURES

Several features have been designed to provide early warning of release of radioactive materials or evidence of potential release of radioactive materials. These are described in detail above. They include the leachate detection system, strain gauge monitoring in the canisters, and groundwater monitoring wells placed around the disposal sites and off site to monitor for potential releases into groundwater. Early warning detection can also include unexpected contamination discovered in vegetation or other environmental media. In addition, visual inspections on the surface, along with periodic surveys of monuments and settlement plates, can manifest potential problems within the waste matrix when major differential settlement occurs.

5.1 Hypothetical Accident Scenarios

The proposed CWF, FWF-CDU, and FWF-NCDU have been designed to satisfy the performance objectives stated in 30 TAC 336.24 through 336.27. Notwithstanding the great care WCS has taken in these preparations, the possibility remains, however remote, that the disposal systems (Site, facilities, and waste) will not perform as planned and required. Examples of ways the disposal systems may fail to perform as planned and as required include the following:

- Unexpected erosion in the cover system
- Unexpected biotic intrusion in the form of animal burrows or presence of deep-rooted vegetation
- Unexpected internal erosion within the cover system leading to excessive settlement, differential settlement, and damage to the performance cover
- Unexpected amounts of water in the leachate collection system and/or the leakage detection system
- Unexpected concentrations of radioactive or hazardous constituents in groundwater monitoring wells
- Unexpected concentrations of radioactive or hazardous constituents in vegetation or other environmental media adjacent to the closed disposal units

Analyses that address the impacts of these types of failure to perform as expected are reported in Application Section 8.3 and in Appendix 7.3.2, "Early Warning and Corrective Action Plan." As demonstrated in those sections, no failure of the disposal system that has been quantitatively analyzed leads to failure to meet the performance objectives.

Despite the favorable demonstrations of risk analyses presented in LA Section 8, WCS has postulated a range of corrective actions that require financial assurances and estimated the cost to accomplish the most costly corrective action. Refer to Section 7.0 of Appendix 7.3.2 for this analysis.

6.0 INSTITUTIONAL CONTROL CARE

Whereas the surveillance activities described above have the purpose of identifying the need for maintenance or repair, Institutional Control care provides this needed support. Institutional Control care consists of simple maintenance activities that would be carried out at any conventional facility, regardless of its characteristics or past activities. Institutional control care activities do not constitute active maintenance, as defined in 30 TAC 336.2, and include such activities as repairing fences, repairing or replacing monitoring equipment, reestablishing vegetation, addressing minor subsidence or erosion, making minor repairs to disposal unit covers, and generally maintaining the grounds of the disposal Site by mowing grass and removing deep-rooted vegetation.

The staff, equipment, and supplies required to enable institutional control care activities are small and relatively. A typical surveillance campaign will require crews of two persons each and appropriate management and administrative support.

Institutional Control care equipment requirements are likewise small. Required equipment will be provided by the outside professional organization and may include:

- Four-wheel-drive pickup truck
- Small tractor
- Tractor implements including front-end loader, backhoe, mower, and post-hole auger
- Dump truck

Supplies will include those necessary to allow minor backfilling, stabilization, fencing, and plumbing activities with appropriate administrative and management support.

A long-term environmental monitoring program will be maintained in compliance with its licenses and permits. This monitoring program will be capable of providing early warning of releases of radionuclides and chemical constituents before they leave the proposed land site boundary. The objectives of the Institutional Control monitoring program are to:

- Ensure that the closed disposal units continue to meet closure requirements. This objective will be met through Site surveillance and media sampling.
- Provide data to support long-term impact evaluations. The results from continued and focused media sampling will enable analyses to confirm predictions of disposal Site performance, as necessary.
- Provide records for review. The records from post-operational monitoring and Institutional Control monitoring serve to document Site closure information and to provide required information for public consideration.

6.1 Qualification of Personnel

Personnel working on site during Institutional Control operations will be required to follow the same qualification requirements found in the WCS Training and Qualification Program.

7.0 CORRECTIVE ACTION

7.1 Unplanned Events

If a substantive failure (e.g., liner or cover system breach) or release of material is encountered, a Corrective Action Plan will be prepared that specifically addresses the deficiency. Additional information is provided in Appendix 7.3.2, “Early Warning and Corrective Action Plan.”

7.2 Corrective Measures

The details of a realistic Corrective Measures Plan will depend upon the failures observed and the details of what actions must be taken. Based on the ways the disposal system may fail, corrective measures that might be employed have been identified and evaluated. Reasonable corrective measures include the following:

- Regrading and reconstruction to remedy excessive erosion
- Removal and reconstruction of portions of the Evapotranspiration (ET) cover

- Removal and reconstruction of portions of the ET cover and portions of the biobarrier, fill, and performance cover
- Removal and reconstruction of portions of the ET cover, portions of the biobarrier, fill, and performance cover, and retrieval of waste packages in the upper waste lifts within a failed disposal cell
- Removal and reconstruction of portions of the ET cover and portions of the biobarrier, fill, and performance cover, and retrieval of all waste packages within a failed disposal cell
- Removal and treatment of leachate from Leachate Collection System for extended period of time
- Pump, treat, and reinject contaminated groundwater

These potential corrective measures are the basis for estimating the costs presented in Appendix 7.3.2. Also, a hypothesized worst-case corrective action is discussed in Section 7.0 of Appendix 7.3.2 and the cost estimate for this is in Appendix 7.3.3.

8.0 COST ESTIMATE

The costs to conduct institutional control activites have been calculated. These costs are presented in Appendix 7.2.3.