ATTACHMENT II-7

CLOSURE PLAN

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A. CLOSURE PLAN

1.0 INTRODUCTION

This closure plan is set forth to comply with the applicable requirements of Utah Admin. Code R315-8-7, Closure and Post-Closure, Utah Admin. Code R315-8-8 and R315-15-11 & 12, Financial Requirements. The contents apply to the Grassy Mountain facility (GM), EPA ID# UTD991301748 to reflect the most current approved permit and facility operations. Detailed descriptions of the relevant units/areas are provided in the specific modules as referenced herein to the permit. Only general descriptions are provided within this plan. Specific closure plan information is identified for each individual unit and/or process area, within the overall facility, as appropriate. This information may be referenced as necessary to provide a comprehensive closure plan, which meets the stated regulatory requirements.

In compliance with applicable regulations, this plan sets forth the necessary actions and requirements to close GM in a manner that minimizes the need for further maintenance and controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters, or to the atmosphere.

In order to facilitate the development of a closure cost estimate for the entire facility, a sequence of closing the current waste management units is presented. However, the actual sequence of unit closures may be different than what is presented. The sequence of closing a unit in this plan is based on minimizing potential exposure of personnel to contaminants and the potential of releasing contaminants to the environment. It is less likely that this sequence will vary from that presented, but it is possible based on circumstances at the time of closure. The plan assumes maximum inventory levels by waste type and provides procedures for disposing of that inventory, for decontaminating and/or disposing of equipment and containment systems and for obtaining closure certification. The cost estimate assumes the use of third parties to perform all closure work.

2.0 FACILITY UNIT DESCRIPTIONS

2.1. General Information

2.1.1. Location

The Grassy Mountain facility is located approximately 83 miles west of Salt Lake City, Utah in Section 16 of Township 1 North, Range 12 West in Tooele County, Utah. The active site, that portion of the property used for active and closed waste management units, is located inside a fence and comprises most of this section. The waste management units are permitted for treatment, storage and disposal of hazardous waste pursuant to the regulations administered by the State of Utah and/or the United States Environmental Protection Agency. Attachment II-1 contains a site plan that shows locations of the various waste management units and the fenced portion of the section. In addition, the facility owns a ½ mile buffer around all of Section 16.

2.1.2. General Hydrogeologic Conditions

The facility is located upon exposed sediments of ancient Lake Bonneville. This geologic formation is a silty clay deposit believed to be up to 10,000 feet thick. It contains no potable water and subsurface water movement is extremely slow. The sediments underlying the site have a range in hydraulic conductivity of 1 x 10^{-4} to 10^{-6} cm/sec and extremely high sodium concentrations. Subsurface water contains total dissolved solids concentrations of 50,000 to 100,000 mg/l. The region receives approximately 6 inches of precipitation annually with evaporation rates of over 40 inches per year. There are no rivers or streams within 20 miles of the facility and the nearest body of water is the Great Salt Lake (30 miles northeast).

2.2. Hazardous Waste Storage/Treatment/Process Units

The following sections provide a description of the currently permitted hazardous waste management units and facilities subject to closure. The descriptions provide an accounting of units and containments which are covered by this closure and post-closure plan, so that future and pending modifications may be clearly delineated. More detailed unit information is provided within referenced permit modules for each unit at the facility.

2.2.1. Container Management Facility (Module III)

The Container Management Facility is an elevated slab, pre-engineered steel roof and side wall structure. Physical features of the structure prevent escape of contaminants should spills or leaks occur and protect the unit from weather and precipitation while the containerized waste material is being managed prior to disposal. The unit has separated drainage areas provided by concrete containment curbing, sumps for containment, and ramps for access. The slab and sump structures are constructed with waste compatible joint materials and water stops to prevent intrusion by waste into the structural unit, as well as leakage through the unit to underlying soils. The Container Management Facility consists of the following units:

Management Unit
Dock 1 (TD01)
Pad 2 (SP01 & NP01)
Pad 3A (TD02)
Pad 3B (SPAD)

Dock 1 and Storage Pads 2 and 3 are utilized to store all wastes accepted at the facility, including wastes not subject to regulation under Subtitle C of RCRA.

2.2.2. Facility Tanks

Specific details about the tanks discussed in this section are contained in Table A, "Existing Tanks, Information Summary". Facility Tanks Include:

Stabilization Tanks
Leachate Storage Tanks

Some of the tanks have ancillary pipes and valves, and other tank equipment. All are located within secondary containment. Secondary containment areas are comprised of concrete slabs with containment curbing, sumps for collection/containment of run-off from selected portions of

the units and secondary containment/leak detection in tank areas. All floor slabs, containment and sump structures are constructed with waste compatible joint materials and water stops to prevent intrusion by waste into the structural unit, as well as leakage through the unit to underlying soils.

2.2.2.1. Waste Stabilization Facility

The Waste Stabilization Facility consists of open-top, square tanks, in which reagents are mixed with the wastes, typically using a backhoe/trackhoe type device. Since the tanks are not storage units, there is no inventory of wastes associated with these units. The facility containment areas include open tank treatment units and secondary containment, transport vehicle unloading areas, treated waste haul vehicle staging areas and ramps for access.

Waste Stabilization Tanks	122-TN-001, 122-TN-002, 122-TN-003

2.2.2.2. Leachate Tanks

The Leachate Tanks are located in two (2) segregated but contiguous, secondary containment areas. RCRA leachate is stored in the four (4) tanks prior to disposal.

Leachate Storage Tanks	119-TN-001, 119-TN-002, 119-TN-003, 119-TN-004

2.2.3. Surface Impoundment Unit (Module V)

Surface Impoundments A is a 1,587,759-gallon, above-grade, impoundment with a surface area of approximately one acre and a maximum depth of approximately 15 feet. In October 1988 the unit was retro-fitted with a double synthetic liner and leak detection system to meet the minimum technology requirements for hazardous waste surface impoundments Utah Admin. Code R315-8-11.2(f) and 40 CFR 264.221(c). Prior to closing this unit, receipts of wastes would be stopped and the balance allowed to evaporate. Thus, no capacity is considered in computation of maximum inventory of waste for this unit. Decontamination and disposal of the unit liner is included in the closure cost estimate.

2.2.4. Landfill Disposal Units (Module VI)

Grassy Mountain currently has four active hazardous waste landfill disposal cells approved for operation: Cells 4, 5, 7. and B/6. Unit-specific final closure design engineering reports are submitted at the time of closure for each cell in accordance with Module VI of the Part B permit, Utah Admin. Code R315-8-7 and R315-8-14.5, and any approved or required applicable modifications. Future planned closures will utilize an approved Geosynthetic Clay Liner (GCL) closure design. The revised typical closure plan design that includes GCL is shown in Module VI. All closure activities shall be in compliance with the CQA Plan for Landfill Cell Construction.

3.0 PARTIAL FACILITY CLOSURE ACTIVITIES

Due to the size and complexity of the facility, partial closure activities are common. This activity will be implemented most often to facilitate the upgrade of treatment, storage and disposal facilities to more technically, advanced units, to close out-of-date or uneconomic processes, to close landfill cells, and to dispose of expendable supplies. In order to facilitate delineation of

typical, partial, facility closure activities, this section will first present a typical, final closure activity scenario based on the conditions of the current facility. The final closure scenario is used as the basis for the closure cost estimate. The final closure scenario is envisioned as follows:

A number of operational units must remain functional to assist in the final closure of the facility. Since it is required that a landfill unit with adequate capacity to contain the final inventory of wastes and contaminated materials remain available for final closure, at least one of the hazardous waste landfill cells will be allocated for the final closure. This landfill will, at least, have available the volume listed under "On-site Management - Landfill Disposal", in Table B, for compliance with Landfill Capacity Assurance requirements. The Leachate Storage Tanks will be required to store the landfill leachate liquid prior to shipping it for disposal during final closure and through post closures of the facility. It is expected that the container management facility and the stabilization system will remain operational until just before final closure of the last open landfill. These will remain open to ensure the proper handling of remaining wastes and waste residues, in accordance with regulations at the time of closure.

Other final closure activities include site monitoring, routine site inspections, groundwater monitoring, decontamination of equipment, structures and areas, and verification sampling and analytical efforts. A summary of the major facility process areas or portions thereof, which likely will remain operational until final closure, follows:

- Hazardous Waste Landfill Cell
- Leachate Storage Tanks
- Stabilization Treatment Tank System
- Container Management Facility

Utilizing this information, all other facility units and/or process areas, or portions of those listed above, may be subject to the partial closure scenario. Each of the major facility process areas have been evaluated for this possibility and specific tasks within this site-wide closure plan, have set forth the necessary elements of partial closure within the requirements of the regulations. Each process area's closure activities meet the regulatory requirements for final closure as presented in Utah Admin. Code R315-8-7 and 40 CFR Part 264 Subpart G, with the exception of notification and certification requirements for tanks and container storage areas. Notification and certification of closure of these non-disposal units is not required until final closure in accordance with current regulations. If however, certification of a closed area under partial closure is made, it will not have to be certified again at the time of facility closure. Candidates for partial closure based on current facility operations include but are not limited to:

- Portions of the Container Management Facility
- Wastewater Treatment Tanks
- Portions of the Vat Stabilization Tank System
- Waste Solvent Tanks
- Portions of the Leachate Treatment Tank System
- Surface Impoundment Unit
- Individual Hazardous Waste Landfill Cells

Partial closure includes discontinuance of use, removal of wastes and residues, and cleaning the particular unit, apparatus or area, as applicable, with or without filing for notification or certification of final closure. Partial closure of any unit may take place at any time. (Note: The Wastewater Treatment Tanks and Waste Solvent Tanks have already been subjected to partial closure and all tanks within these systems are inactive).

Equipment after decontamination may, at the discretion of the owner or operator, remain in place or may be removed. If an item cannot be decontaminated it must be removed for disposal. If an item cannot be decontaminated in place, it will be removed and either disposed or decontaminated in a fixed or temporary containment area.

4.0 MAXIMUM EXTENT OF OPERATIONS

According to Utah Regulations and 40 CFR Part 264, Subpart G, this closure plan delineates the maximum extent of operations of the current facility. This is utilized as a “worst case" scenario for unexpected closure at any time during the facilities operation.

4.1. Management of Maximum Inventory

The information provided in Table A describes the capacity of each unit/area considered at the maximum extent of operations for the facility at any given time during the permit period. Capacity information is used to reasonably quantify the inventory for removal, treatment, transport and/or disposal, as appropriate, at the time of closure. An estimate of residual waste generated during closure procedures (e.g. decontamination of units and soils and residue clean-up from routine operations/treatment) is provided based on the facility decontamination portion of the closure plan. Remaining waste inventory and decontamination residuals are two categories of potential hazardous wastes to be managed during facility closure.

4.1.1. Estimate of Maximum Remaining Waste Inventory

No waste inventory is attributable to the open landfill cells since such cells would be receiving wastes for disposal - not generating wastes from closure of the units. Liquids that may be present in the surface impoundment at the time of final closure are assumed to be evaporated prior to closure. Therefore no costs are associated with management of the potential surface impoundment inventory.

The potential maximum inventory of wastes contained in Table A is assumed to be the amount in storage at the time of closure. Assumed maximum waste inventory at the time of closure is based strictly on the capacity of the container management facility, and capacities of current, active, tank systems.

Table A: Maximum Inventory at Time of Closure

STORAGE UNIT NAME	MAXIMUM INVENTORY (in gallons)
Container Management Facility **Pad 1 (TD01)** **Pad 2 (SP01 & NP01)** **Pad 3A (TD02)** **Pad 3B (SPAD)**	123,900 or 2,253 55-Gallon Drum Equivalents
Container Management Facility Flammable Storage (TD01)	2,750 Gallons or 50 55-Gallon Drum Equivalents
Leachate Tanks 119-TN-001 119-TN-002 119-TN-003 119-TN-004	70,600
Leachate Building	6,000 Gallons
Bulk Solids Storage Area	1,010,000 Gallons Or 132 20-CY Boxes
Note: Stabilization Tanks are not present in this table since waste is not stored in them.	

4.1.1.1. Maximum Inventory Management - Container Management Facility

All Containerized Wastes will be disposed in an on-site landfill after any necessary or required treatment or amendment activities are performed. Any handling and processing of this containerized inventory will be performed in accordance with the current permit conditions and applicable regulations at the time of closure.

4.1.1.2. Maximum Inventory Management – Inactive and Active Tank Systems

Stabilization tanks are not used for storage so there is no associated waste inventory. No waste is considered in inventory for listed, inactive tanks that have been previously emptied and cleaned as described within this plan. At least some of the leachate tanks will be needed through post-closure and thus will not be closed until the end of the post-closure period. The total permitted volume is considered to be disposed, however, for closure cost estimate purposes since the actual number of tanks that will remain during post closure is not known. The tank capacities for the computations of inventory have been taken from Module IV of this permit (inactive tanks and stabilization tanks are only listed for completeness).

4.1.2. Estimate of Closure - Generated Residual Waste lnventory

Table B, “Closure Waste Inventory/Decontamination Residue Quantity Estimates" summarizes the estimates of closure-generated residual waste as necessary to quantify closure management costs. Estimates are based on the decontamination methods and practices anticipated to be employed for the various units and are categorized according to the final management

anticipated. The table provides a summary of the details presented in Appendix 1, "Cost Documentation Appendix (CDA)," and the closure cost "Worksheets." The table outlines estimated landfill capacity assurance quantities, as required.

Table B: Closure Waste Inventory / Decontamination Residue Quantity Estimates

UNIT DESCRIPTION	OFF-SITE MANAGEMENT	ON-SITE MANAGEMENT (LANDFILL DISPOSAL)	
	WASTE INVENTORY (55-Gallon Equivalents)	WASTE INVENTORY (Cubic Yards)	DECONTAMINATION RESIDUAL INVENTORY (Cubic Yards)
Container Management Facility (CMF-1)	538 (CMF-1,1e)	591 (CMF-1, 7a)	110 (CMF-2. 4q)
Bulk Solid Storage Areas (BSSAs)	N/A	3,200 (CMF-1, 1h)	N/A
Put-Piles in Landfill	N/A	11,483 (CLO-1,3q)	N/A
Stabilization Tank System	N/A	N/A	84 (CLO-3, 3s)
Leachate Tank System	N/A	N/A	37.2 (CLO-3, 5s)
Leachate Building			
Surface Impoundment Unit A	N/A	N/A	2,409 (CLO-3, 6q)
Ancillary Closure Activities	N/A	N/A	1,010.9 (CLO-6, 9b)
SUMMARY TOTALS:	**538**	**15,274**	**3651.1**
"Landfill Capacity Assurance" Requirement at the Time of Closure:			**18,961.3**

Note:
The information presented in this table has been consolidated from the closure cost worksheets (CMF and CLO) and Appendix 1, "Cost Documentation Appendix".

4.1.3. Procedures for Handling Hazardous Waste Inventory and Decon Residues

This section presents a general discussion of typical management activities for the waste streams expected to comprise the inventory. Specific procedures related to a particular unit are included in the detailed closure cost estimate work sheets and cost documentation Appendix. Specific waste streams and any ancillary handling requirements such as removal, containerization and transportation, are included in the cost estimates as required for financial assurance.

4.1.3.1. RCRA/TSCA Waste Stream Inventory Management

It should be noted that less than 5% of the total waste inventory of the Container Management Building may be RCRA/TSCA combination waste materials. These materials will not materially affect the cost of disposal of inventory as they will either be calculated into the landfillable volume or into the incinerable volume as the closure plan exists today.

4.1.3.2. On-Site Management

In general, management activities related to the hazardous waste inventory will be handled on-site. As an example, the current facility has the capability of performing such activities as: containerization and re-containerization of wastes as necessary, off-site shipment of non-landfillable wastes, stabilization of residues and (inventory) waste streams, hazardous waste landfill disposal, providing and using container handling equipment and facilities, and mobilization of other equipment as necessary. These management activities reflect a continuation of current, routine, operating practices at the site.

4.1.3.3. Off-Site Management

The off-site management practices expected for closure are the manifesting and loading of wastes destined for incineration or other suitable organic waste management practices, and disposal of leachate and decontamination liquids.

5.0 FACILITY DECONTAMINATION

General facility areas subject to processing hazardous waste will receive a final evaluation of the necessity for decontamination. In addition, this section includes the decontamination of areas such as roads, staging areas, scale areas, laboratory, truck/wheel wash units, etc.

This section presents a discussion of typical decontamination procedures for all operational areas/units. The criteria, procedures and methods of decontamination presented are typical in nature and present a functionally equivalent industry standard. Individual circumstances at the time of closure may require optional approaches to typical decontamination efforts listed below. The closure standards are performance based and thus specifying the exact method of achieving decontamination is not provided. However, the typical methods described have been used to develop the closure cost estimate.

Implementation of Module VIII will, for any portion of the facility at the time of partial closure of a unit or area or total closure of the facility, take precedence over the decontamination procedures described in this closure plan and will, when completed, meet closure requirements.

5.1. Contaminated Equipment, Structures and Facility Areas

The contaminated equipment, structures and other areas to be decontaminated are: the Stabilization Tanks, Leachate Treatment Tanks, Leachate Building and the Container Management Building.

The container management containment surfaces will be assumed to be contaminated. Storage tanks listed in Section 4, Table A are considered to be contaminated even if they are in a clean condition after being placed on an inactive status. The surface impoundment will also require cleaning as part of closure. Details for each specific unit/process area component are considered below and delineated further on the closure cost estimate Worksheets (CMF and CLO) and Cost Documentation Appendix (CDA). Final Closure Costs based on the listed criteria and assumptions are tabulated in Section 14, “Financial Requirements for Closure".

5.2. Typical Decontamination Procedures

5.2.1. Remove Waste Inventory

The waste inventory will be processed and/or treated in accordance with current regulations, the procedures outlined in the permit and/or Waste Analysis Plan. As noted previously, RCRA/TSCA combination waste streams will not alter the combination of waste types or disposal methods already in place in this RCRA Closure Plan.

5.2.2. Inspection of Areas/Equipment

Inspect slab areas, tanks, ancillary process equipment, liquid transfer lines, sump structures and secondary containment areas for spills or evidence of spills, leaks, cracks or other evidence of potential release of contaminants to the environment and document the findings.

5.2.2.1. Remove any accumulated materials; i.e. dust, dirt, etc., that would inhibit recognition of spills or releases during the decontamination process;

5.2.2.2. Inspect containment surfaces for cracks, holes, or evidence of potential leakage or loss of integrity and

5.2.2.3. If cracks, holes, or evidence of potential leakage is documented, a core will be taken at the point(s) where integrity is questioned, through the concrete and no less than one foot into the soil beneath. Samples will be taken from 0-4 inches of depth, 5-8 inches of depth and 9-12 inches of depth. The samples will be analyzed for the constituents found in Appendix VIII of R315-50-10 (40 CFR § 261 by reference).

5.2.2.4. Identify and record the location of damage which could have caused the loss of integrity of the containment system if leakage is quantified during the test and use this information to accomplish step 5.2.6.3 after decontamination of the containment surfaces, and

5.2.2.5. Repair any cracks or other damage to containment surfaces that could release waste waters to the ground during decontamination efforts.

5.2.3. Decontamination of Areas/Equipment

5.2.3.1. Decontamination of tanks and/or piping in place or remove them to fixed or temporary containment for decontamination utilizing decontamination methods for hard surfaces;

5.2.3.2. Decontaminate tanks and equipment inside and out;

5.2.3.3. Remove equipment from containment as necessary to ensure the containment surfaces are properly decontaminated;

5.2.3.4. Dispose of tanks and equipment in lieu of decontaminating them.

5.2.4. Decontaminate Structures

Decontaminate structures removing all stains (chemical stains do not have to be removed) utilizing decontamination methods for hard surfaces (6.1);

5.2.5. Decontaminate Secondary Surfaces

Decontaminate secondary containment surfaces utilizing decontamination methods for hard surfaces;

5.2.6. Re-Inspect

Re-inspect all sump areas, secondary containment and leak detection systems for cracks, holes, or evidence of potential leakage or loss of integrity that was not identified prior to initiation of closure and EITHER:

5.2.6.1. Perform a twenty-four hour hydrostatic test on the surfaces with cracks to determine if the cracks were a potential route outside the containment system. If leakage is quantified, sampling is required (5.2.6.3), and 5.2.7;

5.2.6.2. Remove the water from the containment system. The water shall be managed as a hazardous waste when the testing has been completed, OR EITHER:

5.2.6.3. Collect core samples of the soil and/or concrete to confirm or refute the suspicion of contamination of the subsoils. If contamination is confirmed, go to step 5.2.6.5 and 5.2.6.6.

5.2.6.4. Remove all concrete and soil within six inches of the crack and dispose of it as contaminated.

5.2.6.5. Sample the soil from the trench left after removing the concrete and analyze for volatile, semi-volatile and pesticide/herbicide parameters listed in 40 CFR 264 Appendix IX. Continue expanding the trench both laterally and vertically until the analyses of the samples come back less than or equal to the concentrations listed in the 40 CFR 264 Appendix IX and dispose of the removed soil according to the current regulatory requirements.

5.2.7. Soils Adjacent to the Unit

This sections applies to soils immediately adjacent to the units within six (6) feet [or ten (10) feet in the case of the Container Management Facility] of the outside of the containment areas and in areas where trucks or other equipment had been staged for storage or transfer of wastes.

5.2.7.1. Inspect the area and map the location of stained or discolored soils,

5.2.7.2. Remove the top six (6) inches of exposed soils, and

5.2.7.3. Take a grab sample of the excavated soil from each excavated area and analyze it for volatile, semi-volatile and pesticide/herbicide parameters listed in 40 CFR 264 Appendix IX, and for PCB's for the current SW-826 method and using the

numerical standards set-forth in the PCB Commercial Storage Closure Plan.

5.2.7.4. If the analysis shows levels at or below those listed, the unit may be declared closed and the soil disposed of in the landfill.

5.2.7.5. If the analysis shows levels above those listed, dispose of the soil (landfill disposal assumed) according to the regulations and repeat Sections 5.2.7.2 through 5.2.7.4.

5.2.7.6. Sample and analyze the soil from areas where the soil has been removed

5.2.7.6.1 Take surface (0" to 6") grab samples approximately every 50 feet.

5.2.7.6.2 Take additional surface (0" to 6") grab samples from the locations of stained or discolored soils identified prior to removing the surface layer of soils.

5.2.7.6.3 Analyze soil samples for volatile, semi-volatile and pesticide/herbicide parameters listed in 40 CFR 264 Appendix IX and for PCB's for the current SW-826 method and using the numerical standards set-forth in the PCB Commercial Storage Closure Plan.

5.2.7.6.4 If contamination is identified, remove at least six (6) inches of soil and repeat steps 5.2.7.6.1 through 5.2.7.6.3 until the soil no longer exhibits levels of volatile, semi-volatile and pesticide/herbicide parameters as listed in 40 CFR 264 Appendix IX.

5.2.8. Facility Roadways

The access road to the facility is maintained by Tooele County and consists of asphalt. Asphalt paving continues inside the facility to the north of the Sampling Pad which is located north of the Administration Building. The remainder of the roads at the facility consist of gravel covered dirt roads or dirt road without the gravel. The non-asphalt roadways within the facility have been placed into one of three categories. The categories are defined based on the type of vehicles and their respective payloads that primarily utilize, or have in the past utilized the roadway. The categories are defined later in this section.

The asphalt roadways within the fence line of the facility lead from the gate, to and from the scales, to the sampling/parking area, and to the dirt/dirt-gravel roads identified above. Stained areas, sampling platforms and the scales will be decontaminated according to the plan for hard surfaces. The non-asphalt roadways shall be decontaminated as follows:

5.2.8.1. Sampling

A sampling program will be initiated to determine the existence and extent of any contamination that may be present on the dirt and gravel roadways. The soil sampling program will be conducted utilizing a grid system. Samples will be obtained in any areas of obvious contamination and elsewhere within the grid system. Samples will be taken at a depth of 0 to 6 inches. Composites will be prepared from these samples at a ratio of 2 to 1 and analyzed. The dimensions of the grids will vary depending on the classification of the roadway. Five sampling locations within each grid will be selected randomly. However, within each grid, if an area(s) of potential contamination is noted (i.e., soil discoloration and/or odor), one or more of the sampling locations shall from those areas of suspected contamination. Samples from those locations will be discreet and not be composited and will be documented as such in the sample field log book.

At each sampling location (5 per grid), the sample will be obtained by advancing a bucket or hand auger to a depth of 0 to 6 inches. Each sample will be visually characterized, noted in a field log book and placed in precleaned glassware with teflon-lined caps. Each sample container will be labeled as to sample location and depth interval, and the chain of custody will be initiated for shipment to an approved analytical laboratory. During the sampling activity, the bucket-type hand auger and auxiliary sampling equipment will be cleaned using detergent, distilled water and acetone. The sampling equipment will then be rinsed using distilled water between each sample to avoid cross contamination.

5.2.8.1.1 Road Type A: Type A roads are those used currently, or in the past, for large haul trucks transferring waste from the Stabilization Tanks to the disposal cells and from the disposal cells to the wheel wash. When moving waste from the Stabilization Area to the disposal cells, the haul trucks are uncovered. Type A roads will have 5 samples taken from a 500 square foot grid and shall be conducted as stated above.

5.2.8.1.2 Road Type B: Type B roads are those used by transport vehicles hauling hazardous waste on the way to the Stabilization Tanks, the container storage buildings, and the Bulk Solid Storage Areas. Tarps and other covering systems are removed in the Sampling Platform area. The bulk containers then are transported to its location on site uncovered. Type B roads will have 5 samples taken from a 750 square foot grid and shall be conducted as stated above.

5.2.8.1.3 Road Type C: Type C roads are other facility roads that have not had waste transported on them and are most likely not contaminated. Type C roads will have 5 samples taken from a 1000 square foot grid and shall be conducted as stated above.

5.2.8.2. Road Dimensions and Volumes Based on Type

Type A	Approximate Dimensions		
	Length	Avg. Width	Volume (.5' depth)
Stabilization to Cell B/6	1351'	24'	600 cy
Stabilization to Cell 7	1914'	19'	673 cy
SW Cell 7 Exit to WW	1413'	24'	628 cy
E-W Road N of Cell 7	1240'	24	551 cy
		Type A total volume	2,452 cy

Type B	Dimensions		
	Length	Avg. Width	
Fr. Sampling Pad to SE corner of Cell Z	1668'	30'	927 cy
Fr. Above to PCB Building	1260'	30'	700 cy
Fr. Above to Stabilization	2370'	24'	1053 cy
Fr. PCB tanks to Type A road	340'	24'	151 cy
		Type B total volume	2,831 cy

Type C	Dimensions		
	Length	Avg. Width	
Fr. Old WW to corner E of Cell A	1288'	30'	715 cy
From above to road west side of Cell Y	2,281'	30'	1267 cy
		Type C total volume	1,982 cy

5.2.8.3. Decontamination

Samples will be taken in the areas described above and analyzed for soil pH and for 40 CFR §261, Appendix VIII constituents. If contamination is found, the extent of contamination must be determined in a horizontal and vertical direction. Contaminated soils must be removed until a 6-inch horizontal and vertical stratum of soil in the contaminated area meets the requirements specified below for decontamination as determined by representative soil samples within the contamination zone. As an alternative, instead of determining the vertical and horizontal extent of contamination, a six inch layer of soils be removed from the entire grid , managed according to the Permit and placed in an active landfill. Sampling and analysis shall then be repeated in areas that were identified as contaminated during the previous sampling in order to demonstrate that the contamination has been completely removed.

Soils will be considered decontaminated when analysis of soil pH and 40 CFR§261, Appendix VIII results indicate that background levels have been met. Test methods and procedures will be those specified in the Waste Analysis Plan. Contaminated soils will be transferred to a RCRA or RCRA/TSCA cell at the facility or to an off-site permitted hazardous waste disposal facility.

5.2.9. Personal Protective Equipment

Equip the personnel involved in the decontamination process with appropriate personal protective equipment as designated by the closure safety officer.

5.2.10. Decontaminate Equipment Used

Decontaminate or dispose of equipment used in the decontamination process, to transport, and/or participate in final on-site disposal according to the decontamination procedures in this plan

5.3. Surface Impoundment Unit Decontamination

Surface Impoundment A is a triple-lined impoundment (two synthetic, one clay) with a primary and a secondary leak detection/removal system. The basic components include clay liner and berms, 80 mil HDPE primary liner, 100 mil secondary liner, PVC and HDPE piping, synthetic drainage net, geotextile fabric, concrete pipe supports, gravel drainage media, and gravel armor for exterior berm protection (details of the design are contained in Module V of the permit). The surface impoundment will be closed "clean" pursuant to the requirements of Utah Admin. Code R315-8.11.5(a)(1). In compliance with these requirements, unit hard surfaces will be cleaned as indicated in Section 6, Criteria for Evaluating Decontamination. The hard surfaces may be disposed of instead of decontaminated at the discretion of the Permittee.

5.3.1. Remove Wastewater

Remove wastewater (may be allowed to evaporate) and solid residue and manage in accordance with the waste analysis plan.

5.3.2. Clean the Surfaces

Clean the primary and secondary liners and drainage nets to a hard surface standard. Treatment of rinse waters will depend upon the waste codes associated with the surface impoundment. For closure cost purposes, it is assumed the rinse waters are disposed of as leachate.

5.3.3. Remove the Primary and Secondary Surfaces

Remove and cut the primary and secondary liners and associated drainage nets into sections of manageable proportions for disposal. Reuse of these sections is acceptable at either Grassy Mountain or other hazardous waste facilities. (Disposal is assumed for closure cost purposes.)

5.3.4. Remove the Geotextile Surfaces

Remove and cut the geotextile under layer into sections of manageable proportions for disposal. Reuse of these sections is acceptable at either Grassy Mountain or other hazardous waste facilities. (Disposal is assumed for closure cost purposes.)

5.3.5. Remove the Leachate Collection System

Remove the leachate collection system components for disposal. Reuse is acceptable at either Grassy Mountain or other hazardous waste facilities. (Disposal is assumed for closure cost purposes.)

5.3.6. Examine the Clay Liner

Examine the clay liner for visual evidence of contamination.

5.3.6.1. Take grab samples of the visually contaminated areas;

5.3.6.2. Analyze the samples for parameters appropriate for the waste managed in the surface impoundment;

5.3.6.3. Remove visually contaminated soil for disposal (assumed to be landfill disposal) if required, based on the analyses of the samples;

5.3.6.4. When no visual contamination is found, samples will be taken from the areas of most likely to be contaminated (the sump area) and analyzed. The results will determine reuse or disposal of the clay.

5.3.7. Clay Liner Removal

Leave the clay liner in place or remove and stockpile it for future use.

5.3.8. Groundwater Monitoring Wells

Groundwater monitoring wells utilized for monitoring of Surface Impoundment A (MW10, MW11 & MW12) shall continue to be monitored.

5.3.8.1. Sample these wells and analyze the samples in accordance with Module VII of the Permit upon closure of this waste management unit.

5.3.8.2. Continue routine groundwater monitoring for one year after closure.

5.3.8.3. Review the data collected for this final year, as well as the complete historic monitoring results.

5.3.8.4. Ensure that no statistically significant hazardous contamination has been detected.

5.3.8.5. If none, abandon the monitoring wells in-place or remove in accordance with regulatory or industry-established standards.

5.3.8.6. If contamination is detected in any of the three groundwater monitoring wells, follow the procedures specified in Modules VII & VIII for corrective action.

6.0 CRITERIA FOR EVALUATING DECONTAMINATION

6.1. Closure of "Hard Surface" Waste Treatment or Containment Items

Closure of "hard surface" items (steel tanks, concrete containment, equipment, HDPE liners, etc.) are performance-based and any cleaning method may be used to achieve the standard. No actual, direct testing of the surfaces is intended, as there are no general “wipe tests" which have been approved or designated for the constituents identified in Table C. The standards for successful decontamination vary with this disposition of the items being decontaminated as follows:

6.1.1. Unrestricted Use

Decontamination may be declared when rinse water of the item(s) being decontaminated meets the parameters and concentration limits listed in Table C, “Decontamination Wash Water Analysis".

6.1.2. Left On-Site Or Sold To An Equipment Broker, For Which No End User Is Known

Decontamination may be declared when the visual standard set forth in 40 CFR 268.45 for a “clean debris surface" is met and at least 10% of like items from a given waste area have been rinsed and the rinse water of the item being decontaminated meets the parameters and concentration limits listed in Table C.

6.1.3. Items To Be Used In Industrial Services That Are Not Related To Food, Feed or Drinking Water, Or Are To Be Scrapped For Remelt

Decontamination may be declared when the visual standard set forth in 40 CFR 268.45 for a “clean debris surface" is met.

6.1.4. Items Being Sold For Reuse In Used Oil Service, Low Level Radioactive Waste Service, Or Other Industrial Services Approved by UDEQ

Decontamination may be declared after a single pass with a pressure washer, sandblaster or equivalent means is used to remove residue (without disassembly) from the interior of the equipment and the exterior is cleaned to either the rinsate standard in Table C or the visual standard set forth in 40 CFR 268.45 for a “clean debris surface” is met.

6.1.5. Items Being Sold For Reuse In Hazardous Waste Service

Decontamination may be declared after a single pass with a pressure washer, sandblaster or equivalent means is used to remove residue (without disassembly) from the interior of the equipment and the exterior is cleaned to either the rinsate standard in Table C or the visual standard set forth in 40 CFR 268.45 for a “clean debris surface" is met. If the unit is not to be containerized during shipment, the exterior must be cleaned to either the rinsate standard (Table C of this plan) or the visual standard set forth in 40 CFR 268.45 for a clean debris surface.

6.1.6. Debris To Be Disposed Of In A RCRA Landfill

Decontamination may be declared after a single pass with a pressure washer, sandblaster or equivalent means is used to remove residue.

6.1.7. Numerical Standards for PCB Decontamination

Because, after closure, the structures and/or land will be converted to another use, the site shall be cleaned up to the non-restricted, high occupancy area requirements. Target levels for this classification are described below:

- High contact indoor or outdoor solid surfaces shall be cleaned to 10-micrograms/100 cm^2 (as measured by standard wipe test).
- Low contact, outdoor, impervious solid surfaces shall be cleaned to 10-micrograms/100 cm^2 (standard wipe test).
- Low contact, outdoor, non-impervious solid surfaces shall be cleaned to 10-micrograms/100 cm^2.
- For spill cleanups, PCB contaminated soil shall be removed to 10 ppm, provided that soil is excavated to a minimum depth of 10 inches. The excavated soil shall be replaced with clean soil (< 1 ppm PCBs).
- As Bulk PCB Remediation Waste, PCB contaminated soil and other non-impervious surfaces shall be removed to 1 ppm.

Table C: Decontamination Wash Water Analysis

PARAMETERS	MAXIMUM CONCENTRATION INCREASE (mg/l) (See Note)
Oil and Grease	15.0
Phenols	0.2
Arsenic – T	0.1
Barium – T	5.0
Cadmium – T	0.03
Copper – T	1.0
Lead – T	0.1
Mercury – T	0.005
Selenium – T	0.05
Silver – T	0.1
Total Organic Halides (TOX)	0.5
Total Organic Carbon (TOC)	40.0
Cyanides	0.2

Note:
The values given are the maximum allowable increase in a parameter, above the level that exists in the final rinse water prior to use. This "prior existing level" shall be established as the average of at least three (3) analyses of the rinse water, plus three (3) standard deviations. These analyses will be made at the time of closure, when a water source is known.

NOTES to Table C, Decontamination Wash Water Analysis:

1. Many different waste codes will be handled throughout the Grassy Mountain facility. Over its operating lifetime, it is likely, that each unit will eventually handle practically all waste codes actually received, either directly or through the "mixture" and "derived from" rules. From a regulatory viewpoint, then, the potential variety of contamination at all units will be identical. Therefore, only one list of parameters will be considered. This list will be used for all waste management units throughout the facility.

   The parameters listed in Table C are intended to represent the contaminants likely to be present in the highest levels, and to give an indication of potentially toxic constituents. It must be noted that many of the constituents of concern - the organics, especially the chlorinated organics - are volatile and will likely vaporize for the most part prior to or during the cleaning process itself. The loss of these relatively small amounts of materials is considered unavoidable and non-threatening to the environment or the general public. Any remaining heavy, residual organics will be included by the analyses for Oil and Grease, TOC, and/or TOX. All of these parameters will detect general contamination to relatively small values.

   It must also be remembered that the decontamination procedures listed in the application apply only to surfaces which are relatively impermeable (designated as "hard surfaces"). They will be used only for high-density polyethylene, concrete and metallic items, such as tanks. Any porous material, such as soils is intended for landfilling or other EPA/State approved treatment technologies. For most of the items to be decontaminated, a visual inspection will be as useful as actual analysis of the wash; however, to provide a quantitative, objective measure of contamination (or the absence thereof), and a historical record, these analyses will be conducted as defined for "hard surfaces".

   Wide ranging analyses for specific organic chemicals, such as that achieved by GCMS, will not provide significantly more useful information. In addition, these analyses take considerable periods of time, during which site conditions would have changed markedly (due to continuing exposure to the elements). The parameters chosen will adequately sample for all constituents of real concern, or for indicators of those constituents.

   It is expected that both field and laboratory methodology will change considerably between the time of permit issuance, and the time of actual closure. However, to cover the possibility of earlier closure of some units this sampling and analysis plan will apply.

   The limits chosen were based on the recognition that it will be highly impractical, if not Impossible, to use "detection limits" as a cleanup standard. This is because the water used

for the cleanup will likely have naturally occurring contamination that far exceeds detection limits in many cases.

This would be the case even if planned potable water were used for the equipment wash down. Grassy Mountain may use process water for the decontamination of the facility that does not meet drinking water standards, but will be significantly cleaner for most parameters than the ground water existing under the site. "Cleaning" waters may have relatively high levels of contamination, compared to "detection limits", before any wash down occurs. The levels listed in Table C were chosen based upon these considerations.

6.2. Decontamination Residuals Management

6.2.1. Determine Disposal Method

Determine the appropriate disposal method of residual wastes generated during closure utilizing the standards of 40 CFR 262.11.

6.2.2. Solids

Solids will generally be treated, if required, and landfilled.

6.2.3. Wash and Rinse Water

Wash and rinse water or other cleaning residues will be collected and handled as hazardous waste. The Closure Cost Estimate assumes that 5% of these residues will need to be treated, stabilized and landfilled and the liquids will be disposed of appropriately off-site. However, it is possible that the wastewater may also be stored in the leachate storage tanks and disposed of as leachate. Although wash water may be stabilized on-site, treated at a facility with an NPDES permit and discharged, deep well injected, or incinerated, etc., the method actually used will be decided at the time of closure, based upon site availability, regulatory approvals, and economics. The closure cost estimate assumes that liquids are sent to a facility with an NPDES permit and discharged.

If wash or rinse water is contaminated with PCBs, the wash or rinse water will be incinerated.

7.0 CLOSURE CAPPING OF LANDFILL CELLS

7.1. Final Cover System

Closure of the facility will require the application of the designed final cover system to all open hazardous waste landfill cells at the facility. All such landfill cell closures shall meet the requirements of Utah Admin. Code R315-8-7 and R315-8-14.5 and this permit.

7.2. Intent to Begin Closure

Notification of intent to begin closure activities, affecting an individual landfill cell, or partial/final closure of the facility will include, for plan approval, a unit-specific closure plan application for final cover. Typical major components of any closure application for the final cover of any cell(s) is listed below:

7.3. Design Engineering Report (DER)

A Design Engineering Report (DER) with commentary that may include such design considerations as:

- Preparation of waste mound materials and surface prior to placement of final cover;
- Design considerations to accommodate settlement and subsidence of the final cover, considering initial settlement, primary and secondary consolidation, slope stability and all historic experience concerning these issues at the site;
- Design modifications to reflect recent technological advancements of any portion of the design or Construction Quality Assurance Plan (Attachment VI-2). This will include design changes, which are a result of site-specific (or other related) experience concerning a design or construction element.

7.3.1. Engineering Drawings

Engineering Drawings for the final cover of the specific cell, which demonstrate that, the requirements of R315-8-14.5(a) have been complied with.

7.3.2. Construction Quality Assurance Plan (CAQ)

The most recent Construction Quality Assurance Plan (CQA) (Attachment VI-2) approved for landfill construction by the regulatory authority applicable to the particular cell(s) designated for closure.

7.3.3. Closure Plan Approval Application

The application for closure plan approval for the facility includes an engineering report and any necessary engineering drawings and specifications, as applicable, for the disposal of all treated leachate from the closed units during the closure activities and the post-closure period.

7.3.4. Closure Certification

Final cover closure activities shall meet the closure certification requirements outlined in Section 11.

8.0 GROUNDWATER MONITORING REQUIREMENTS

The groundwater monitoring requirements during partial or final closure does not change from that during the facility operation, which is governed by Module VII of the permit. Module VII provides for groundwater monitoring of all land disposal units at the facility including those subject to Utah Solid Waste Management Rules, Utah Hazardous Waste Management Rules, RCRA (Resource Conservation and Recovery Act) and TSCA (Toxic Substances Control Act) for the PCB Cells on site.

Module VII allows routine operational, closure and post-closure groundwater monitoring for the TSCA waste management areas to be governed by EPA's PCB Approvals for these units. These approvals are more stringent than or equivalent to the Module VII requirements.

The site will maintain the groundwater monitoring protection program including all monitored wells active at the time of closure. However, the TSCA cell monitoring wells are excluded from

the closure cost estimate. Those groundwater monitoring costs are accounted for in the closure cost estimates in the EPA's PCB Approvals for those units. Below is a current list of the all Grassy Mountain land disposal units and their associated number of monitoring wells.

AFFECTED UNITS	MONITORING WELLS
RCRA/Utah HWMR Units (Landfill Cells 1, 2, 3, 4, 5, 7 & IWC-1 and IWC-2)	34 (Includes 4 background wells)
Industrial Landfill Cell 3	3
TSCA/RCRA Cell B/6	9
TSCA Regulated Units (Cells X, Cell Y, & Cell Z)	15

9.0 ANCILLARY CLOSURE ACTIVITIES

At the time of closure, either partial or final, there will be pertinent activities which will be necessary to ensure that the closure activity will satisfy the requirements set forth by Utah Admin. Code R315-8-7, or more specifically 40 CFR 264.112 (b)(5). These ancillary activities will include leachate management, run-on/run-off control, and site security, described below.

9.1. Leachate Management

9.1.1. Leachate & Landfill Cells

Apply leachate management during closure activities only to the land disposal units.

9.1.2. Management of Leachate and Leachate Collection Systems

Manage leachate and leachate collection and removal systems in accordance with Module VI of the facility permit and applicable regulations.

9.1.3. Monitor and Maintain Records

Monitor and maintain records for each leak detection/collection system in accordance with the requirements of Module VI of the permit.

9.1.4. Leachate Storage

Collect and store leachate in the leachate storage tanks prior to shipping the leachate off-site for disposal. This disposal method is assumed for closure cost estimate purposes. However, any appropriate treatment or disposal method available at the time of closure may be utilized at the discretion of the Permittee.

9.1.5. Routine Maintenance

Perform all routine maintenance and repairs necessary for the proper operation of the leachate management system.

9.2. Run-On/Run-Off Control

Run-On/Run-Off control in the context of this plan refers to the non-contaminated precipitation at the site. In general, the site-wide run-off control will be managed in the same predominantly passive manner as during normal operations, utilizing the site grading, collection system and collection basins. This in-place system will be maintained during the closure period.

9.3. Security/Inspection

9.3.1. Security

9.3.1.1. Maintain security during final closure in accordance with the requirements of Utah Admin. Code R315-8-2.5, Module II and Attachment II-2 of the RCRA permit.

9.3.1.2. Provide additional security measures during partial closure activities at the facility, as required by the Health and Safety Plan applicable to that closure activity.

9.3.2. Inspections

Conduct inspections in accordance with Module II and Attachment II-4 for waste management units still storing and/or managing waste except that:

9.3.2.1. The Permittee may cease conducting inspections for a storage and/or treatment unit that has been certified by an Independent, Utah Registered Professional Engineer as being closed in accordance with this closure plan. The inspection form for that area may be so annotated until it is removed from the permit via a permit modification.

9.3.2.2. After waste is removed from a treatment and/or storage unit, emergency equipment specified in the contingency plan for that area is no long required to be present or maintained as long as work permits for these units are issued and include a list of emergency equipment required for the closure activities being performed.

9.3.2.3. During the closure of a unit, emergency equipment specified in the contingency plan may be replaced with different but equivalent equipment.

9.3.2.4. Record on the appropriate inspection form when closure activities or the status of the unit being closed preempt or negate the need for the standard inspection requirements.

9.3.2.5. Continue performing standard inspections that require looking for spills, leaks, abnormal conditions, etc. Where inspections aren't otherwise required, these inspections will be performed each day closure work is performed in an area.

9.4. Final/Partial Closure Application for Plan Approval

All closure activities require notification of the pending activity (and accompanying plan modifications) to reflect changed conditions, as appropriate. The application for plan approval of affected Closure activity must address required changes to all the major components outlined by this Site-Wide Closure Plan or any unit-specific closure plan. As discussed throughout, this may include, for example, the closure schedule, engineering requirements, groundwater monitoring and/or other ancillary closure activities.

10.0 SURVEY PLAT

No later than the submission of the certification of closure of each hazardous waste disposal unit or facility, the Permittee will file with Tooele County and submit to the Director a survey plat indicating the location and dimensions of the closed landfill cells with respect to permanently surveyed benchmarks. This plat must be prepared and certified by a professional land surveyor. The plat filed with Tooele County must contain a note prominently displayed, which states the owner's or operators obligation to restrict disturbance of the hazardous waste disposal unit in accordance with the applicable post-closure requirements.

11.0 CLOSURE CERTIFICATION

Submit within 60 days of completion of closure of a waste management unit or the facility by registered mail or other proof of delivery, certification that the facility has been closed in accordance with the specifications in the approved closure plan, Attachment II-7. An independent, registered professional engineer qualified by experience and education in the appropriate engineering field must sign the certification.

12.0 COMPLETE UNIT AND FINAL FACILITY CLOSURE SCHEDULE

Disposal unit closure plan applications for plan approval will include a schedule of the closure activities. This will include the total time expected for complete closure of the unit and the time period required for complete removal of any inventory to assure compliance with 40 CF'R 264.113, as referenced by Utah Admin. Code R315-8-7. Complete closure of a storage and/or treatment unit will be conducted in accordance with the schedule presented in Table D unless a request for an alternate schedule is requested of the Division.

The final facility closure schedule presented in Table D, "Site Wide Closure Schedule," depicts a reasonable projection of closure activities based on conditions currently anticipated within the scope of this plan. This schedule presents the more critical “milestone" projections to allow for tracking of the progress of closure and to define the length of time closure will take.

The time frame established begins with the actual closure effort, assuming sixty (60) day notification of closure and initiation of work within thirty (30) days of receipt of the last waste. The submittal of final closure certification and filing the survey plat with the local land authority within sixty (60) days of completion are depicted by the last two months. The ninety (90) day requirement for complete waste inventory management is also depicted.

The projected completion of final site wide facility closure is anticipated to take longer than the 180 day requirement of 40 CFR 264.113 (b). The schedule projected in Table D, "Site Wide Closure Schedule," presents a minimum 24-month schedule based on the size and complexity of

the current overall operation. The schedule also considers a hypothetical initiation month of September, which is restrictive due to possible slowing of work due to winter weather. The maximum extent of operations predicts that two landfill cells will be operational prior to final site wide closure. However, this closure plan and respective closure cost estimate acknowledges that currently three RCRA landfill cells are operational. Since these units require extensive efforts for closure governed by construction quality assurance issues that require efforts and physical conditions that are restricted during 4-5 months of the winter season, the final facility closure will, of necessity, require more than the statutory 180 days to complete.

During this extended time frame, as well as throughout the closure period, the Permittee will continue to take all steps to prevent threats to human health and the environment from the unclosed non-operating portions of the facility. This effort is supported by the requirements to continue all monitoring and maintenance of the facility in accordance with the permit throughout the closure period.

Table D: Site Wide Closure Schedule (Elapsed Time in Months)

	1	2	3	4	5	6	7	8	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Inventory Management																							
Decontamination																							
Non-Operating Cell Closure																							
Last Cell Closure																							
Ancillary Operations																							
Certification/Notice																							

13.0 CONTINGENT CLOSURE REQUIREMENTS

There are no units located at the facility subject to the contingent closure plan requirements in accordance with the Utah Admin. Code R315-8-11.5 and this closure plan. If, at the time of closure of Surface Impoundment A, unexpected conditions are found which prevent closure in accordance with the above requirements, an amendment to the closure plan shall be necessary in accordance with Utah Admin. Code R315-8-7 [40 CFR 264.112(c)(3)].

14.0 FINANCIAL REQUIREMENTS FOR CLOSURE

The closure cost estimate presented herein reflects the requirements of Utah Admin. Code R315-8-8, and R315-15-11 & 12 and 40 CFR Part 264, Subpart H - Financial Requirements. More specifically, this section reflects the necessary modifications to respond to 40 CFR 264.142(c). The following cost estimate reflects the closure costs for the container management facility as a separate closure effort. The subsequent section addresses the general site wide closure, including the container management facility. Since closure of the container management facility will likely occur at the time of site wide closure, the certification costs would be redundant and have been subtracted from the site wide closure. The individual unit-specific Container Management Facility (CMF) Cost Worksheet Tables (CMF Worksheets 1-4) are followed by the site wide closure (CLO) Worksheet Tables (CLO Worksheets 1-7). The Cost Documentation Appendix (CDA, Appendix 1) includes discussion and analysis of estimated costs. The Cost Documentation Appendix, together with the Closure Cost Worksheets, provide appropriate

documentation and references concerning the details of the estimate to allow the reviewer to evaluate their accuracy and appropriateness.

14.1. Closure Cost Estimate Support Information

The Closure Cost Worksheets provide the information utilized to develop the cost estimates provided below. Additional details of the estimates and references are provided in Appendix 1, "Cost Documentation Appendix (CDA)." The CDA is outlined to follow the Worksheets, mostly in order.

14.2. Container Management Facility Closure Cost Worksheets

The following Closure Cost Worksheets (CMF Worksheets 1-4) provide the information utilized to develop the Container Management Facility (CMF) Closure Cost Estimate. The Container Management Facility Closure Cost Estimate follows these Worksheets.

14.3. Site-Wide Closure Cost Estimate Support Information

The following Closure Cost Worksheets (Worksheets CLO 1-7) provide the information utilized to develop the site-wide Closure Cost Estimate. The site-wide Closure Cost Estimate follows these Worksheets.

Worksheet CMF-1: Inventory Management

1.	**CONTAINER INVENTORY (Maximum in 55-Gallon Equivalents)**	
a.	Total number of containers in all the storage areas. (From Table A, TD01, Pad 2, TD02, SPAD in 55-Gallon Equivalents)	2,302
b.	Maximum inventory of containerized on-site management waste. (1b)	2,302
c.	Maximum inventory of Bulk Solids Transport Containers On-Site. (Cubic Yards)	2,000
d.	Maximum inventory of Bulk Solids after treatment. (1c x 1.6)	3,200
2.	**RE-CONTAINERIZATION OF WASTE**	
a.	Number of damaged containers that may require overpacking or other modified packaging. (See CDA)	69
b.	Re-containerization Unit Cost (See CDA) ($/Container)	$200
c.	**TOTAL RE-CONTAINERIZATION COST [2a x 2b]:**	**$13,800**
3.	**CONTAINER MOBILIZATION**	
a.	Number of pallets to be loaded for on-site disposal/transport. (1b x 0.25)	575
b.	Mobilization Unit Cost. (See CDA) ($/Pallet)	$13.90
c.	**TOTAL CONTAINER MOBILIZATION COST [(3ax3b):**	**$7,993**
4.	**OFF-SITE MANAGEMENT OF INVENTORY**	
a.	Quantity of containers to be managed off-site:	50
b.	Truck capacity: (Number of 55-gallon equivalents per truck.)	80
c.	Number of loads: (4a / 4b) (Partial shipments are invoiced as though a full shipment.)	1
d.	Transportation Cost: ($/Load to Aragonite)	$240
e.	Estimated Transportation Cost: (4c x 4d)	$240.00
f.	Off-site incineration costs: (See CDA) ($/55-Gallon Equivalent)	$225.00
g.	Total Estimated Off-Site Incineration Costs (4a x 4f)	$11,250.00
h.	**TOTAL ESTIMATED OFF-SITE MANAGEMENT COSTS [4e + 4g]:**	**$11,490.00**
5.	**ON-SITE TREATMENT/DISPOSAL OF CONTAINER MANAGEMENT FACILITY "OTHER" INVENTORY AND BULK SOLIDS STORAGE AREA**	
a.	Quantity of containers to be treated on-site by stabilization prior to disposal: (0.40 x 1b)	920.8
b.	Unit cost of stabilization followed by landfill disposal: (See CDA) ($/Container)	$155.89
c.	Total estimated cost for on-site treatment (stabilization) of container inventory: (5a x 5b)	**$143,544**

d.	Quantity of containers designated for direct landfill disposal: (0.60 x 1b) = number of containers	1381.2
e.	Unit cost for direct landfill disposal of containers: (See CDA) ($/Container)	$3.68
f.	Total estimated cost for direct landfill disposal of container inventory: (5d x 5e)	**$5,083**
g.	Unit cost of bulk inventory stabilization/treatment: (See CDA) ($/Cubic Yard)	$180
h.	Unit cost of bulk inventory direct landfill disposal: (See CDA) ($/Cubic Yard)	$13.51
i.	Estimated cost of stabilization/treatment of bulk solids: (BSSA) (1c x 5g)	**$360,000**
j.	Estimated cost of landfill disposal of bulk solids after treatment: (BSSA) (1d x 5h)	**$42,232**
k.	**TOTAL ESTIMATED COST OF ON-SITE MANAGEMENT (5c + 5f + 5i + 5j):**	**$550,859**
6.	**SURFACE IMPOUNDMENT SOLIDS MANAGEMENT**	
a.	Thickness of solids remaining in surface impoundment at time of closure: (Feet)	1.5
b.	Surface area of surface impoundment: (See CDA) (Square Feet)	50,976
c.	Total estimated volume for disposal: [(6a x 6b)/27] (Cubic Yards)	2,832
d.	Unit cost for direct landfill disposal: (See CDA) ($/Cubic Yard)	$13.51
f.	**TOTAL ESTIMATED COST FOR ON-SITE MANAGEMENT (6c + 6d):**	**$38,260**
7.	**TOTAL LANDFILL CAPACITY ASSURANCE REQUIRED**	
a.	Treated <u>container</u> inventory “on-site disposal” volume estimate: (See CDA for Landfill Capacity Assurance) (Cubic Yards) {[(5a x 1.6) + 5d] x 0.27}	771
b.	Untreated container inventory “on-site disposal” volume estimate: (See CDA for Landfill Capacity Assurance) (Containers) (5d) 1381 containers x 26 cubic feet/container/27 = cubic yards required for untreated containerized waste	1,330
c.	Treated <u>bulk</u> inventory “on-site disposal” volume estimate: (See CDA for Landfill Capacity Assurance) (Cubic Yards) (1d)	3,200
d.	Untreated surface impoundment “on-site disposal” volume estimate: (See CDA for Landfill Capacity Assurance) (Cubic Yards) (6c)	2,832
e.	**TOTAL LANDFILL CAPACITY ASSURANCE REQUIRED (Cubic Yards) [7a + 7b + 7c + 7d]:**	**8,133**

Worksheet CMF-2: Facility Decontamination

1.	**PROTECTIVE AND SAFETY EQUIPMENT FOR PERSONNEL**	
a.	Number of personnel requiring safety equipment for decontamination:	34
b.	Equipment cost: ($/person)	$360.75
c.	**TOTAL COST OF PERSONNEL SAFETY EQUIPMENT (1a x 1b):**	**$12,266**
2.	**EQUIPMENT DECONTAMINATION**	
a.	Since these units will close during final facility closure, the costs attributable to this category are included in the site-wide closure cost estimate: (See CDA)	N/A
3.	**CONTAINER MANAGEMENT FACILITY STRUCTURE DECONTAMINATION**	
a.	Area of pad and building interior to be decontaminated: (See CDA) (Square Feet)	46,511
b.	Structure decontamination unit cost-initial wash-down: (See CDA) ($/Square Feet)	$2.11
c.	Structure decontamination unit cost-final wash-down: (See CDA) ($/Square Feet)	$1.26
d.	**TOTAL CONTAINER MOBILIZATION COST [(3ax3b)+(3a x 3c]:**	**$156,742**
4.	**ON-SITE TREATMENT/DISPOSAL OF DECONTAMINATION RESIDUALS**	
a.	Residual generation rate for initial wash-down of container management facility: (See CDA) (Gallons/Square Feet)	1.6
b.	Residual generation rate for final wash-down of container management facility: (See CDA) (Gallons/Square Feet)	1.0
c.	Quantity of aqueous residuals to be treated: (Gallons) [(4a + 4b) x 3a)]	120,929
d.	Unit cost of transportation to San Jose Facility for aqueous treatment and discharge: (See CDA)	$1.82
e.	Estimated cost of aqueous residual treatment: (4c x 4d)	**$220,090**
f.	Quantity of solid residuals from decontamination to be stabilized: (See CDA) (Cubic Yards)	19
g.	Unit cost of stabilization: (See CDA) ($/Cubic Yard)	$180
h.	Estimated cost of solids residual treatment: (4f x 4g)	**$3,420**
i.	Unit cost of on-site landfill disposal of bulk solids: (See CDA) ($/Cubic Yard)	$13.51
j.	Estimated volume of treated residuals: (See CDA) (Cubic Yards) (4f x 1.6)	30.4
k.	Estimated cost of on-site landfill disposal of bulk solids: (4i x 4j)	**$410**
l.	Quantity of soils to be removed adjacent to container management facility: (See CDA) (Cubic Yards)	80
m.	Unit cost of soils removal: (See CDA) ($/Cubic Yard)	$1.17
n.	Estimated cost of landfill disposal of soils: [4l x (4i + 4m)]	**$1,174**
o.	**TOTAL COST OF ON-SITE TREATMENT/DISPOSAL OF DECONTAMINATION RESIDUALS: (4e + 4h + 4k + 4n)**	**$225,095**

p.	Decontamination residuals “on-site disposal” volume estimate: (See CDA for Landfill Capacity Assurance) (Cubic Yards) (4l + 4j)	110
q.	**TOTAL LANDFILL CAPACITY ASSURANCE REQUIRED (Cubic Yards) [4p]:**	**110**

Worksheet CMF-3: Ancillary Closure Activities

1.	**SITE REGRADING**	
a.	Quantity of soils for regarding to compensate for removals: (Cubic Yards)	80
b.	Cost of hauling, regarding and miscellaneous requirements: (See CDA) ($/Cubic Yard)	$4.33
c.	Total cost of site regarding: (1a x 1b)	**$346**
2.	**SUMP TESTING**	
a.	Number of sumps within container management facility:	5
b.	Unit cost of hydrostatic testing of sumps: (See CDA) ($/Sump)	$200
c.	Total cost of hydrostatic testing of sumps: (See CDA) ($/Sump) (2a x 2b)	**$1,000**
d.	**TOTAL COST OF ANCILLARY CLOSURE ACTIVITIES (1c + 2c):**	**$1,346**

Worksheet CMF-4: Closure Certification

1.	**SAMPLING AND ANALYSIS TO CONFIRM DECONTAMINATION**	
a.	Number of samples for confirmation of "clean" wash water: (See CDA)	6
b.	Unit cost of liquid analysis: (See CDA) ($/Sample)	$650
c.	Total cost of liquid sample analysis for decontamination confirmation: (1a x 1b)	**$3,900**
d.	Number of samples for soil decontamination confirmation: (See CDA)	20
e.	Unit cost of soil/sludge analysis: (See CDA) ($/Sample)	$650
f.	Cost of soil/sludge sample analysis for decontamination confirmation: (1e x 1d)	**$13,000**
g.	Number PCB samples for liquid analysis:	10
h.	Unit cost of liquid samples for PCB analysis: (See CDA) ($/Sample)	$39
i.	Cost of liquid sample analysis for decontamination confirmation: (1g x 1h)	**$390**
j.	Number PCB samples for soil analysis:	55
k.	Unit cost of soil samples for PCB analysis: (See CDA) ($/Sample)	$39
l.	Cost of liquid sample analysis for decontamination confirmation: (1g x 1h)	**$2,145**
m.	**TOTAL ESTIMATED ANALYTICAL COSTS FOR CMF CLOSURE (1c +1f + 1i + 1l):**	**$19,435**
2.	**CERTIFICATION DOCUMENTS BY INDEPENDENT PROFESSIONAL ENGINEER**	
a.	Certification documents by independent Professional Engineer: (See CDA)	$65,579
m.	**TOTAL CERTIFICATION COSTS BY INDEPENDENT PE (2a):**	**$65,579**

Table E: Container Managment Facility and BSSA Closure Cost Estimate

CONTAINER MANAGEMENT FACILITY AND BSSA CLOSURE COST ESTIMATE		
Re-Containerization	(CMF-1)	$13,800
Container Mobilization	(CMF-1)	$7,993
Off-Site Management of Inventory	(CMF-1)	$**11,490**.00
On-Site Management of Inventory	(CMF-1)	$550,859
On-Site Management of Surface Impoundment Solids	(CMF-1)	$38,260
Personnel Safety Equipment	(CMF-2)	$12,266
Structure Decontamination	(CMF-2)	$156,742
Treatment/Disposal of Decontamination Residuals	(CMF-2)	$225,095
Ancillary Closure Activities	(CMF-3)	$1,346
Certification Sampling Analytical Costs	(CMF-4)	$19,435
Certification of Container Management Facility Closure	(CMF-4)	$65,579
SUBTOTAL ESTIMATED CMF & BSSA CLOSURE COST:		**$$1,102,865.00**
Administrative and Contingency Costs (10%)		**$110,286**
TOTAL ESTIMATED (2010 $'s) OF CMF AND BSSA CLOSURE COSTS:		**$1,213,151**

Worksheet CLO-1: Inventory Management of Hazardous Waste Treatment/Storage/Process Units

1.	**CONTAINER MANAGEMENT UNIT INVENTORY**	
a.	See previous Worksheets CMF-1 through CMF-4	N/A
2.	**CURRENT MAXIMUM FACILITY TANK SYSTEM INVENTORY**	
a.	Leachate Storage Volume: (See Table A) (Gallons)	65,000
3.	**PUT-PILE INVENTORY**	
a.	Maximum inventory of put piles:	250
b.	Average unit cost to analyze: (See CDA)	$58
c.	Total cost to initially analyze put piles: (See CDA) (3a x 3b)	**$14,500**
d.	Average failure rate of put pile treatment: (Fraction of Piles)	0.03
e.	Number of put piles that must be retreated: (3a x 3d)	7.5
f.	Volume of expansion due to retreatment: (Factor)	1.3
g.	Average size of each put pile: (Cubic Yards)	45
h.	Total Yards Requiring Retreatment: (Cubic Yards) (3e x 3f x 3g)	439
i.	Unit cost to retreat, analyze and move put piles: ($/Cubic Yard)	$180
j.	Total cost to retreat failed put piles: (3h x 3i)	**$79,020**
k.	Unit cost to move failed put piles: ($/Cubic Yard)	$2
l.	Total cost to move failed put piles: (3h x 3k)	**$878**
m.	Cost to re-analyze re-treated put piles: (3e x 3b)	**$435**
n.	**TOTAL COST TO INITIALLY ANALYZE, RETREAT, MOVE PUT PILES ($) (3c + 3j +3l + 3m):**	**$94,833**
o.	Put-pile volume estimate, treatment successful on first time: (See CDA for Landfill Capacity Assurance) (Cubic Yards) [3a x 3g x (1-3d)]	10,912
p.	Put-pile volume estimate, treatment not successful on first time: (See CDA for Landfill Capacity Assurance) (Cubic Yards) [3h x 1.6]	571
q.	**TOTAL LANDFILL CAPACITY ASSURANCE REQUIRED (Cubic Yards) [3o + 3p]:**	**11,483**
4.	**LEACHATE INVENTORY MANAGEMENT**	
a.	Maximum hazardous waste inventory for off-site treatment: (Gallons) (2a)	65,000
b.	Unit cost of bulk liquid treatment off-site, includes mobilization: (See CDA) ($/Gallon)	$0.90
c.	**TOTAL ESTIMATED OFF-SITE MANAGEMENT COSTS (4a x 4b):**	**$58,500**
	TOTAL ESTIMATED INVENTORY MANAGEMENT (3n + 4c):	**$153,333**

Worksheet CLO-2: Hazardous Waste Management Unit (HWMU) Decontamination

1.	**PROTECTIVE AND SAFETY EQUIPMENT FOR PERSONNEL**	
a.	Number of personnel requiring safety equipment for decontamination: (See CDA)	34
b.	Initial equipment cost per person: (See CDA)	$361
c.	Total initial equipment cost: (1a x 1b)	**$12,274**
d.	Renewing equipment cost per person per day: (See CDA)	$18
e.	Number of closure days: (See CDA)	416
f.	Total renewing equipment cost: (1a x 1d x 1e)	**$247,520**
g.	**TOTAL COST OF PERSONNEL SAFETY EQUIPMENT [1c + 1f)]:**	**$259,794**
2.	**CONTAINER MANAGEMENT FACILITY**	
a.	See Appendix No. 2.2 (Closure Costs for Container Management Facility are included in Section III – Financial Requirements for Closure).	N/A
3.	**STABILIZATION TANK SYSTEM**	
a.	Containment area to be decontaminated: (See CDA) (Square Feet)	7,825
b.	Tank and equipment area to be decontaminated: (See CDA) (Square Feet)	6,480
c.	Total HWMU area to be decontaminated: (3a + 3b)	14,305
d.	Unit cost for initial decontamination wash-down: (See CDA) ($/Square Feet)	$2.11
e.	Unit cost for final decontamination wash-down: (See CDA) ($/Square Feet)	$1.26
f.	Total cost for stabilization tank system decontamination: [3c x (3d + 3e)]	**$48,208**
g.	Number PCB samples for liquid analysis:	5
h.	Unit cost of liquid samples for PCB analysis: (See CDA) ($/Sample)	$100
i.	Total cost of liquid sample analysis for decontamination confirmation: (3g x 3h)	**$500**
j.	Number PCB samples for soil analysis:	20
k.	Unit cost of soil samples for PCB analysis: (See CDA) ($/Sample)	$100
l.	Total cost of liquid sample analysis for decontamination confirmation: (3j x 3k)	**$2,000**
m.	Dismantling/demolition costs for one stabilization tank assuming it leaked: (See CDA)	$1,904
n.	Number of stabilization tanks to be dismantled:	3
o.	Total cost for dismantling/demolition of stabilization tanks: (3m x 3n)	**$5,712**
p.	**TOTAL HWMU DECONTAMINATION COST [3f + 3i + 3l + 3o]:**	**$56,420**

4.	**LEACHATE TREATMENT TANK SYSTEM**	
a.	Tank and equipment area to be decontaminated: (See CDA) (Square Feet)	7,035
b.	Unit cost for initial decontamination wash-down: (See CDA) ($/Square Feet)	$2.11
c.	Unit cost for final decontamination wash-down: (See CDA) ($/Square Feet)	$1.26
d.	Total cost for leachate tank system decontamination: [4a x (4b + 4c)]	**$23,708**
e.	Number of PCB Samples for liquid analysis:	5
f.	Unit cost of liquid samples for PCB analysis: (See CDA) ($/Sample)	$100
g.	Cost of liquid sample analysis for decontamination confirmation: (4e x 4f)	**$500**
h.	Number of PCB samples for soil analysis:	20
i.	Unit cost of soil samples for PCB analysis: (See CDA) ($/Sample)	$100
j.	Cost of liquid sample analysis for decontamination confirmation: (4h x 4i)	**$2,000**
k.	**TOTAL HWMU DECONTAMINATION COST [4d + 4g + 4j]:**	**$26,208**
5.	**SURFACE IMPOUNDMENT UNIT**	
a.	Containment liner area to be decontaminated: (See CDA) (Square Feet)	50,976
b.	Unit cost for initial decontamination wash-down: (See CDA) ($/Square Feet)	$2.11
c.	Total wash-down decontamination: (5a x 5b)	**$107,559**
d.	Quantity of liner and leak detection media removal: (See CDA – Landfill Capacity Assurance) (Cubic Yards)	821
e.	Unit cost for liner components removal: (See CDA) ($/Cubic Yard)	$8.49
f.	Total cost of liner component removal: (5d x 5e)	**$6,970**
g.	Quantity of clay liner for removal: (See CDA – Landfill Capacity Assurance) (Cubic Yards)	1,556
h.	Unit cost of clay liner removal: (See CDA) ($/Cubic Yard)	1.17
i.	Total cost of clay liner removal: (5g x 5h)	**$1,820**
j.	**TOTAL HWMU DECONTAMINATION COST (5c + 5f + 5i):**	**$116,349**
	TOTAL FACILITY HWMU DECONTAMINATION COST (1g + 3p + 4k + 5fj):	**$458,771**

Worksheet CLO-3: Treatment and Disposal of Decontamination Residuals

1.	**CONTAINER MANAGEMENT FACILITY**	
a.	See Condition No. 14.2, CMF Closure Cost Worksheets	N/A
2.	**STABILIZATION TANK SYSTEM**	
a.	Residual generation rate of initial decontamination wash-down of unit: (See CDA) (Gallons/Square Feet)	1.6
b.	Residual generation rate of final decontamination wash-down of unit: (See CDA) (Gallons/Square Feet)	1.0
c.	Quantity of residuals to be treated off-site: [(2a + 2b) x 3c{from CLO-2}] (Gallons)	37,193
d.	Unit cost of off-site transportation and management at treatment facility with NPDES permit: (See CDA) ($/Gallon)	$1.82
e.	Quantity of solid residuals from decontamination: (See CDA) ($/Gallon) (2c x 0.05)	1,860
f.	Total estimated cost of off-site transportation and management at treatment facility with NPDES: [(2c – 2e) x 2d]	**$64,306**
g.	Quantity of decontamination residuals to be stabilized prior to disposal: (See CDA) (3e converted from gallons to cubic yards) (2e/55 x 0.27)	9
h.	Unit cost of bulk stabilization for residuals: (See CDA) ($/Cubic Yard)	$180
i.	Total cost of stabilization for landfill disposal of residuals: (2g x 2h)	**$1,620**
j.	Estimated volume of treated decontamination residuals: (See CDA – Landfill Capacity Assurance) (Cubic Yards) [2g x 1.6]	14
k.	Unit cost of on-site landfill disposal of bulk solids: (See CDA) ($/Cubic Yard)	$13.51
l.	Total cost of on-site landfill disposal of stabilized residuals: (2j x 2k)	**$189**
m.	Quantity of soils removed for area decontamination: (See CDA – Landfill Capacity Assurance) (Cubic Yards)	70
n.	Unit cost of soils removal: (See CDA) ($/Cubic Yard)	$1.17
o.	Total cost of soils removal: (2m x 2n)	**$82**
p.	Total cost of on-site disposal of soils residuals: (2m x 2k)	**$946**
q.	**TOTAL COST OF TREATMENT/DISPOSAL OF DECON RESIDUES (2f + 2i + 2l + 2o + 2p):**	**$67,143**
r.	Decontamination residuals “on-site disposal” volume estimate: (See CDA for Landfill Capacity Assurance) (Cubic Yards) (2j + 2m)	84
s.	**TOTAL LANDFILL CAPACITY ASSURANCE REQUIRED (Cubic Yards) [2r]:**	**84**
3.	**LEACHATE TANK SYSTEM**	
a.	Residual generation rate of initial decontamination wash-down of unit: (See CDA) (Gallons/Square Feet)	1.6
b.	Residual generation rate of final decontamination wash-down of unit: (See CDA) (Gallons/Square Feet)	1.0
c.	Quantity of residuals to be treated: (Gallons) [(3a + 3 b) x 4a{from CLO-2}]	18,291
d.	Unit cost of off-site transportation and management at the Aragonite incinerator: (See CDA) ($/Gallon)	$0.99
e.	Quantity of solid residuals from decontamination: (See CDA) (Gallons) (3c x 0.05)	915

f.	Total estimated cost of off-site transportation and management at treatment facility with NPDES: [(3c – 3e) x 3d]	**$17,202**
g.	Quantity of decontamination residuals to be stabilized prior to disposal: (See CDA) (3e converted from gallons to cubic yards) (3e/55 x 0.27)	4.5
h.	Unit cost of bulk stabilization for residuals: (See CDA) ($/Cubic Yard)	$180
i.	Total cost of stabilization for landfill disposal of residuals: (3g x 3h)	**$810**
j.	Estimated volume of treated decontamination residuals: (See CDA – Landfill Capacity Assurance) (Cubic Yards) (3g x 1.6)	7.2
k.	Unit cost of on-site landfill disposal of bulk solids: ($/cubic yard) (see CDA)	$13.51
l.	Total cost of on-site landfill disposal of stabilized residuals: (3j x 3k)	**$97**
m.	Quantity of soils removed for area decontamination: (See CDA – Landfill Capacity Assurance) (Cubic Yards)	30
n.	Unit cost of soils removal: (See CDA) ($/Cubic Yard)	$1.17
o.	Total cost of soils removal: (3m x 3n)	**$35**
p.	Total cost of on-site landfill disposal of stabilized residuals: (3m x 3k)	**$405**
q.	**TOTAL COST OF TREATMENT/DISPOSAL OF DECON RESIDUALS (3f + 3i + 3l + 3o + 3p):**	**$18,144**
p.	Decontamination residuals “on-site disposal” volume estimate: (See CDA for Landfill Capacity Assurance) (Cubic Yards) (3j + 3m)	37.2
q.	**TOTAL LANDFILL CAPACITY ASSURANCE REQUIRED (Cubic Yards) [3 p]:**	**37.2**
4.	**SURFACE IMPOUNDMENT UNIT A**	
a.	Residual generation rate of initial decontamination wash-down of unit: (See CDA) (Gallons/Square Feet)	1.6
b.	Quantity of aqueous residuals to be treated: (Gallons) [(4a x 5a{from CLO-2})	81,562
c.	Unit cost of off-site transportation and management at treatment facility with NPDES permit: (See CDA) ($/Gallon)	$1.82
d.	Quantity of solid residuals from decontamination: (See CDA) (Gallons) (4b x 0.05)	4,078
e.	Total estimated cost of off-site transportation and management at treatment facility with NPDES: [(4b – 4d) x 4c]	**$141,020**
f.	Quantity of decontamination residuals to be stabilized prior to disposal: (See CDA) (6d converted from gallons to cubic yards) (4d/55 x 0.27)	20
g.	Unit cost of bulk stabilization for residuals: (See CDA) ($/Cubic Yard)	$180
h.	Total cost of stabilization for landfill disposal of residuals: (4f x 4g)	**$3,600**
i.	Estimated volume of treated decontamination residuals: (See CDA – Landfill Capacity Assurance) (Cubic Yards) [4d/55 x 0.27 x 1.6]	32
j.	Unit cost of on-site landfill disposal of bulk solids: (See CDA) ($/Cubic Yard)	$13.51
k.	Total cost of on-site landfill disposal of stabilized residuals: (4i x 4j)	**$433**
l.	Quantity of liner component and leak detection media removed: (See CDA) (Cubic Yards) (5d {from CLO-2})	821
m.	Total cost of liner/leak detection media and land disposal: (4l x 4j)	**$11,092**
n.	Quantity of clay liner/soils removed: (See CDA) (Cubic Yards) (5g {from CLO-2})	1,556

o.	Total cost of clay liner land disposal: (4m x 4j)	**$21,022**
p.	**TOTAL COST OF TREATMENT/DISPOSAL OF DECON RESIDUALS [4e + 4h + 4k+ 4m + 4o]:**	**$177,167**
p.	Decontamination residuals "on-site disposal" volume estimate: (See CDA for Landfill Capacity Assurance) (Cubic Yards) (4i + 4l + 4n)	2,409
q.	**TOTAL LANDFILL CAPACITY ASSURANCE REQUIRED (Cubic Yards) [4p]:**	**2,409**
	TOTAL COST OF TREATMENT/DISPOSAL OF DECONTAMINATION RESIDUALS: [2q + 3q + 4q]	**$262,454**

Worksheet CLO-4, Final Cover/Landfill Closure

1. FINAL COVER LANDFILL CLOSURE (BASED ON ACTUAL COSTS OF SIMILAR CLOSURE CAPS (SEE CDA)		
a.	Cell 7 ~ (830 feet x 830 feet) (square feet)	$2,630,675
b.	**TOTAL COST OF FINAL COVER/LANDFILL CLOSURE (1a + 1b):**	**$2,630,675**

Worksheet CLO-5, Groundwater Monitoring During Closure Activities

1. GROUNDWATER MONITORING – DETECTION MONITORING BACKGROUND & COMPLIANCE POINT		
a.	Number of wells in HWMU monitoring system including 4 background wells: (See CDA)	55
b.	Number of wells partially covered by TSCA sampling requirements for PCB, Volatile, Semi-Volatile and Class 3 parameters, including 2 background wells:	23
c.	Number of wells for full analysis including 2 background wells:	32
d.	Quantity of samples collected per well per sampling event: (See CDA) (Samples/Well)	1
e.	Number of QA/QC duplicate analyses per sampling event ½ covered by TSCA closure: (See CDA)	3
f.	Number of field blank samples per sampling event: (See CDA) (Includes one bottle blank. Balance covered by TSCA.)	1.5
g.	Number of field blank samples for volatile constituents per sampling event: (See CDA) (Another 6 are done as part of the TSCA events.)	6
h.	Number of completed Class 1 and Class 3 analyses performed per event: [1c + 1d + 1e + 1f]	37.5
i.	Cost per sample for complete Class 1 and Class 3 analysis:	$928
j.	Total cost for completed Class 1 and Class 3 analysis: (1h x 1i)	**$34,763**
k.	Number of samples without volatile, semi-volatile and Class 3 parameters:	23
l.	Cost per sample for Class 1 parameters less volatiles and semi-volatiles:	$315
m.	Total cost for Class 1 parameters less volatiles and semi-volatiles: (1k x 1l)	**$7,245**
n.	Unit cost of laboratory analysis for volatile field blanks: (See CDA) ($/Sample)	**$90**
o.	Total analytical costs per sampling event for extra volatile samples: (1g x 1n)	**$540**
p.	Shipping and data package costs: (See CDA)	**$8,211**
q.	Total analytical costs per sampling event: (1j + 1m + 1o + 1p)	**$50,759**
r.	Total cost for groundwater monitoring sampling, reporting, administration: (See CDA) ($/Sampling Event)	**$45,688**
s.	Number of sampling events during closure: (See CDA)	4
t.	Annual monitoring well maintenance costs:	**$603**
u.	**Total Groundwater Monitoring Costs During Closure [1s x (1q + 1r + 1t/2)]:**	**$386,994**

Worksheet CLO-6, Ancillary Closure Activities

1.	**LEACHATE MANAGEMENT**	
a.	Leachate pumping and transfer from landfill cells: (See CDA) (Gallons/Day Averaged)	1,317
b.	Number of RCRA cells: (Includes Industrial Waste Cells 1 and 2)	8
c.	Closure period expected for final closure is 2 years: (Days)	730
d.	Leachate volume total: (Gallons) (1a x 1c)	961,410
e.	Unit cost of leachate pumping and transfer: (See CDA) ($/Gallon)	0.09
f.	Total cost of leachate pumping and transfer: (1d x 1e)	**$86,527**
g.	Unit cost of off-site transportation and management at the Aragonite incinerator: (See CDA) ($/Gallon)	$0.99
h.	Quantity of solid residuals: (See CDA) (Gallons) (1d x 0.05)	48,071
i.	Total estimated cost of off-site transportation and management at treatment facility: [(1d – 1h) x 1g]	**$922,168**
j.	Quantity of leachate management residuals to be stabilized prior to disposal: (See CDA) (1h converted from gallons to cubic yards) (1h/55 x 0.27)	236
k.	Unit cost of bulk stabilization for landfill disposal of treated leachate residuals: (See CDA) ($/Cubic Yard)	$180
l.	Total cost of stabilization of leachate residuals: (1j x 1k)	**$42,480**
m.	Estimated volume of treated residuals: (See CDA – Landfill Capacity Assurance) (Cubic Yards) (1j x 1.6)	377
n.	Unit cost of on-site landfill disposal of bulk solids: (See CDA) ($/Cubic Yard)	$13.51
o.	Total cost of on-site landfill disposal of stabilized residuals: (1m x 1n)	**$5,093**
p.	**TOTAL COST OF LEACHATE MANAGEMENT [1f + 1i + 1l + 1o]:**	**$1,056268**
2.	**RUN-ON/RUN-OFF CONTROL MAINTENANCE**	
a.	Unit cost of maintenance crew: (See CDA) ($/Day)	$960
b.	Estimated days of maintenance during closure: (See CDA)	24
c.	**TOTAL COST OF RUN-ON/RUN-OFF CONTROL MAINTENANCE (2a x 2b):**	**$23,040**
3.	**SECURITY/INSPECTION**	
a.	Personnel required for security during closure: (See CDA) (Hours/Day)	24
b.	Duration of period requiring security during closure: (See CDA) (Days)	365
c.	Unit cost of personnel for security: (See CDA) ($/Hour)	$18
d.	Fraction of security associated with RCRA closure:	0.67
e.	**TOTAL COST OF SECURITY DURING CLOSURE (3a x 3b x 3c x 3d):**	**$105,646**
4.	**MOBILIZATION/DEMOBILIZATION OF HEAVY EQUIPMENT**	

a.	Mobilization/demobilization of six heavy pieces of equipment (see CDA)	**$9,000**
5.	**SITE REGRADING/RESTORATION**	
a.	Volume of soil disturbance for decontamination: (See CDA) (Cubic Yards)	200
b.	Quantity of fill material (on-site) for regrading: (See CDA) (Cubic Yards)	200
c.	Unit cost of fill material for regrading – excavation and haul: (See CDA) ($/Cubic Yard)	$3.10
d.	Total cost of fill material: (5a x 5c)	**$620**
e.	Quantity of other site regrading: (See CDA) (Cubic Yards)	1,556
f.	Unit cost of site regrading: ($/Cubic Yard)	$1.23
g.	Total cost of regrading: [(5b + 5e) x 5f]	**$2,160**
h.	**TOTAL COST OF SITE RESTORATION (5d + 5g):**	**$2,780**
6.	**SUMP TESTING**	
a.	Number of sumps affected:	11
b.	Unit cost of sump testing: (See CDA) ($/Sump)	200
c.	**TOTAL COST OF SUMP TESTING (6a x 6b):**	**$2,200**
7.	**EQUIPMENT DECONTAMINATION (GENERAL)**	
a.	Number of units of equipment to be decontaminated: (See CDA)	42
b.	Unit cost of decontamination: ($/Unit)	$1,686
c.	Total cost of miscellaneous equipment decontamination: (7a x 7b)	**$70,812**
d.	Decontamination residual generation rate: (See CDA) (Gallons/Unit)	1,300
e.	Total decontamination residual generated: (Gallons) (7a x 7d)	54,600
f.	Unit cost of off-site transportation and management at treatment facility with NPDES permit: (See CDA) ($/Gallon)	$1.82
g.	Total estimated cost of off-site transportation and management at treatment facility: [(7e -7h) x 7f]	**$94,403**
h.	Quantity of solid residuals from decontamination: (See CDA) (7e x 0.05) (Gallons)	2,730
i.	Quantity of decontamination residuals to be stabilized prior to disposal: (See CDA) (4e converted from gallons to cubic yards) (7h/55 x 0.27)	13.5
j.	Unit cost of bulk stabilization for landfill disposal of treated leachate residuals: (See CDA) ($/Cubic Yard)	$180
k.	Total cost of stabilization of leachate residuals: (7i x 7j)	**$2,430**
l.	Estimated volume of treated decontamination residuals: (See CDA – Landfill Capacity Assurance) (Cubic Yards) [(7g/55 x 0.27 x 1.6]	21.6
m.	Unit cost of on-site landfill disposal of bulk solids: ($/Cubic Yard) (See CDA)	$13.51
n.	Total cost of on-site landfill disposal of stabilized residuals: (7l x 7m)	**$292**
o.	**TOTAL COST OF EQUIPMENT DECONTAMINATION (7c + 7g + 7k + 7n):**	**$167,937**

8.	**TRUCK WASH STATION DECONTAMINATION**	
a.	Number truck wash stations:	4
b.	Area of station for decontamination per station: (Square Feet)	3,000
c.	Quantity of gravel/soils removal for decontamination per station: (See CDA – Landfill Capacity Assurance) (Cubic Yards) 100 cubic yards/station x 4 stations	400
d.	Unit cost for decontamination wash-down: (See CDA) ($/Square Feet)	$2.11
e.	Unit cost for soils/gravel removal: (See CDA) ($/Cubic Yard)	$1.17
f.	Total cost of decontamination: (8a x 8b x 8d) + (8a x 8c x 8f)	**$25,788**
g.	Decontamination residual generation rate: (See CDA) (Gallons/Square Feet)	2.6
h.	Total aqueous decontamination residual generated: (Gallons) (8a x 8b x 8g)	31,200
i.	Unit cost of off-site transportation and management at treatment facility with NPDES permit: (See CDA) ($/Gallon)	1.82
j.	Quantity of solid residuals from decontamination: (See CDA) (Gallons) (8h x 0.05)	1,560
k.	Total estimated cost of off-site transportation and management at treatment facility: [(8h – 8j) x 8h]	**$53,945**
l.	Quantity of decontamination residuals to be stabilized prior to disposal: (See CDA) (8j converted from gallons to cubic yards) (8i/55 x 0.27)	7.7
m.	Unit cost of bulk stabilization of residuals: (See CDA) ($/Cubic Yard)	$180
n.	Total cost of stabilization of residuals: (8l x 8m)	**$1,386**
o.	Estimated volume of treated decontamination residuals: (See CDA – Landfill Capacity Assurance) (Cubic Yards) [(8l x 1.6]	12.3
p.	Unit cost of on-site landfill disposal of stabilized residuals: (See CDA) ($/Cubic Yard)	$13.51
q.	Total cost of on-site landfill disposal of stabilized residuals: (7l x 7m)	**$166**
r.	Quantity of fill material needed on-site for regrading of truck wash: (Cubic Yards) (8a x 8c)	400
s.	Unit cost of fill material for regrading, excavation, haul: (See CDA) ($/Cubic Yard)	$3.10
t.	Total cost of fill material: (8r x 8s)	**$1,240**
u.	Unit cost of site regrading: ($/Cubic Yard)	$1.23
v.	Total cost of regrading: (8r x 8u)	**$492**
w.	**TOTAL COST OF TRUCK WASH DECONTAMINATION/RESTORATION (8f + 8k + 8n + 8q +8t + 8v):**	**$83,017**
9.	**TOTALS FOR ANCILLARY CLOSURE ACTIVITIES**	
a.	**TOTAL COST OF ANCILLARY CLOSURE ACTIVITIES [1p + 2c + 3e + 4a + 5h + 6c + 7o + 8w]:**	**$1,449,888**
b.	**TOTAL DECONTAMINATION RESIDUE FROM ANCILLARYCLOSURE ACTIVITIES** **(**1m + 5a +7l + 8c + 8o) in cubic yards	**1010.9**

Worksheet CLO-7, Closure Certification

1. SAMPLING AND ANALYSIS TO CONFIRM DECONTAMINATION		
a.	Number of samples for HWMU decontamination confirmation: (See CDA less Container Management Facility samples)	20
b.	Number of samples for confirmation of "clean" wash water: (See CDA)	10
c.	Unit cost of liquid analysis: (See CDA) ($/Sample)	$650
d.	Cost of liquid sample analysis for decontamination confirmation: [(1a + 1b) x 1c]	**$19,500**
e.	Number of samples for soil decontamination confirmation: (See CDA less Container Management Facility samples)	59
f.	Unit cost of soil/sludge analysis: (See CDA) ($/Sample)	$650
g.	Cost of soil/sludge sample analysis for decontamination confirmation: (See CDA) (1e + 1f)	**$38,350**
h.	**TOTAL ESTIMATED ANALYTICAL COSTS FOR FACILITY CLOSURE (1d + 1g):**	**$57,850**
2. CERTIFICATION DOCUMENTS BY INDEPENDENT PROFESSIONAL ENGINEER (SEE CDA)		
a.	Certification documents by independent professional engineer (see CDA)	**$131,158**
	TOTAL CLOSURE CERTIFICATION COSTS (1h + 2a):	**$189,008**

Table F, Total Site-Wide Facility Clousre Cost Estimates

Total Site-Wide Facility Closure Cost Estimate	
Hazardous Waste Management Unit Inventory Management (CLO-1)	$153,333
Hazardous Waste Management Unit Decontamination (CLO-2)	$458,771
Treatment and Disposal of Decontamination Residuals (CLO-3)	$262,454
Final Cover/Landfill Closure (CLO-4)	$2,630,675
Groundwater Monitoring During Closure (CLO-5)	$386,994
Ancillary Closure Activities (CLO-6)	$1,449,888
Closure Certification (CLO-7)	$189,008
Container Management Facility Closure Cost (Table E less Closure Certification of $65,579 & Contingency)	$1,025,796
Subtotal Total Site-Wide Facility Closure Cost	**$5,421,465**
Administrative and Contingency Costs (10%)	**$542,147**
Total Estimated Present Worth (2001 $'s) Of Closure Costs	**$5,963,612**

B. POST-CLOSURE PLAN

15.0 INTRODUCTION

This facility post-closure document is set forth to comply with the applicable requirements of Section Utah Admin. Code R315-8-7. Closure and Post-Closure, and Utah Admin. Code R315-8-8 - Financial Requirements. The contents apply to the Grassy Mountain facility, EPA ID UTD991301748, to reflect areas and issues contained within the most current, approved permit. All portions of the permitted facility, which are interpreted to be affected by the post-closure requirements, are listed in Section 16.1 of this plan.

This plan sets forth the necessary actions and requirements, which could reasonably be expected, for post-closure care of the Grassy Mountain Facility. The post-closure monitoring and maintenance will, to the extent practicable, be developed to detect, in a timely manner, and prevent post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters, or to the atmosphere.

Post-closure care for all affected units will commence, in accordance with this plan, upon completion of closure requirements and issuance of any approved modifications of same.

16.0 FACILITY POST-CLOSURE REQUIREMENTS

16.1. Affected Hazardous Waste Management Units

Post-Closure care is required for all hazardous waste management units (HWMUS) at which hazardous wastes will remain after closure. Based on the current permit for the facility, the landfill units are the only HWMU's subject to post-closure care.

Grassy Mountain currently has twelve (12) landfill disposal units approved under the permit: RCRA Cells 1, 2, 3, 4, 5, and 7; TSCA/RCRA Cell B/6 and Industrial Cells 1 and 2. TSCA Cells X, Y, & Z at the facility are not subject to this permit, through authorization of EPA Region 8. Industrial Cells 1 & 2 have been closed as RCRA Cells and are managed as RCRA cells. RCRA Cells 1, 2 and 3 have been closed. The RCRA Groundwater Program (RCRA Permit Module VII) covers that portion of the groundwater monitoring program for the TSCA cells that the TSCA groundwater monitoring program does not cover. The TSCA program covers Class 1 volatiles and semi-volatiles and Class 3 parameters. TSCA Cells X and Y are closed. The general configuration and location of each of the landfill cells at Grassy Mountain is illustrated in Attachment II-1. Specific details of the particular RCRA units are contained in Module VI of the permit and permit references such as the associated Design Engineering Reports (DERs), Constructed Cell Record Drawings, and QA/QC Documentation.

16.2. Monitoring and Maintenance Activities

After final closure of any landfill cell, the Permittee shall comply with the monitoring and maintenance requirements of the plan approval and Utah Admin. Code R315-8-14.5 that includes, at a minimum, the following:

- Groundwater monitoring and administrative reporting in compliance with the applicable requirements of Utah Admin. Code R315-8-6-1
- Maintenance of the groundwater monitoring system to allow compliance with the groundwater monitoring requirements of Utah Admin. Code R315-8-6.1 (c);
- Operation of the leachate collection/detection and removal system until such time as leachate generation accumulates at a rate too small to pump. This shall include all administrative reporting requirements of the permit;
- Maintenance of the integrity and effectiveness of the final cover, including repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events,
- Prevention of run-on and run-off from eroding or otherwise damaging the final cover of any unit or cell; and
- Protection and maintenance of surveyed benchmarks used in complying with Utah Admin. Code R315-8-14.5.

The specific activities detailed below include all tasks that could reasonably be expected during the post-closure care period. Typical monitoring and maintenance inspection, maintenance and operational tasks, and the expected frequency are discussed below.

16.2.1. Groundwater Monitoring

In accordance with Utah Admin. Code R315-8-6, the Permittee shall conduct post-closure groundwater monitoring activities for the HWMU's consistent with the most current plan approval conditions for these units. These conditions are outlined and set forth in Module VII of the permit.

The current conditions delineated in Module VII and Module II have been utilized for the purpose of projecting post-closure activities and estimating post-closure costs. The facility groundwater monitoring program includes all monitoring wells defined in Module VII for the RCRA Waste Management Areas at the time of closure. Fifty-five (55) wells, 23 TSCA, 30 RCRA, 3 IWC-3 and 4 background wells are considered in this estimation of post-closure care costs. The current annual groundwater monitoring, administration, reporting and maintenance costs tabulated in Worksheet CLO-5, "Groundwater Monitoring During Closure Activities" are utilized as the basis for post-closure groundwater monitoring costs. For closure cost estimate purposes, it is assumed that the monitoring costs of two of the background wells are covered by the TSCA post-closure plans.

16.2.2. Leachate Management

In accordance with Utah Admin. Code R315-8.14.5(b), the Permittee shall continue to operate the leachate collection and leak detection systems associated with each of the RCRA HWMU's until such time as leachate generation accumulates at a rate too small to pump with the existing pumps. "A rate too small to pump with existing pumps" is defined as follows: If daily pumping produces 650 gallons or less of leachate per seven day period for two weeks, weekly pumping is allowed. If weekly pumping produces 150 gallons or less of leachate per week for two months, monthly pumping is allowed. If monthly pumping produces 250 gallons or less per month for two months, bi-monthly pumping is allowed. If bi-monthly pumping produces 167 gallons or

less for each of three, two-month periods, semi-annual pumping is allowed. If pumping produces 250 gallons or less per semi-annual pumping for two semi-annual periods, annual pumping is allowed. If pumping has been moved to a less frequent schedule and pumping produces more leachate than would have been produced at the previous frequency, then the pumping frequency will return to the previous frequency. This logic is repeated in the table below. Any existing data may be used to determine the starting frequency during post-closure.

Frequency	If at or less than this amount, go to next frequency.	Average Daily Pumping Rate	If greater than this amount for any one period, return to previous frequency.
Daily	650 Gallons / 7-Days for Two Weeks	92.9 Gallons/Day	N/A
Weekly	150 Gallons/Week for Two Months	21.4 Gallons/Day	650 Gallons / Week
Monthly	250 Gallons / Month for Two Months	8.2 Gallons/Day	650 Gallons / Month
Bi-Monthly	167 Gallons / Two-Month Period for Three Two-Month Periods	2.7 Gallons/Day	500 Gallons / Two-Month Period
Semi-Annual	250 Gallons/Six Months	1.4 Gallons/Day	501 Gallons/Six Months
Annual	N/A	N/A	500 Gallons/Year

The management of these systems shall comply with the operational and reporting requirements of R315-8.1-4.2(a)(2) and applicable requirements contained in Module VI of the permit. The current permit conditions and operational procedures for leachate management have been utilized for the purpose of projecting post-closure activities and estimating post-closure costs as described under "Ancillary Closure Activities' in the Cost Documentation Appendix. Leachate Management Costs over a two-year period are discussed in the CDA and estimated in Worksheet CLO-6, “Ancillary Closure Activities," Section 9.1, "Leachate Management". No solid residuals are expected to be generated from collecting leachate from closed cells over the post-closure period. The total post-closure annual costs for leachate collection and disposal efforts exclude solids disposal. This method of estimating leachate costs is believed to be conservative based on a reasonable expectation that reduced rates of leachate generation will result at the closed cells over time.

16.2.3. Maintenance Activities

In accordance with Utah Admin. Code R315-8.14.5 and applicable plan approval conditions, the Permittee shall maintain the integrity and effectiveness of the final cover, including making repairs as necessary to correct the effects of settling, subsidence, erosion or other events that could reasonably be expected to occur over the 30 year post-closure period. These maintenance activities include maintenance of the leachate management system and groundwater monitoring system as necessary. Groundwater monitoring system maintenance costs are included in the sampling and analysis cost estimates.

16.2.3.1. Routine Inspections

Routine inspections of pertinent facility systems are required by this plan and applicable regulations. Typical inspection items are listed below as a guide for the monitoring and inspection of the Grassy Mountain facility at such time when no hazardous waste operations are taking place. During facility operations, the units in "post-closure status" will be inspected and monitored in accordance with the operations inspection schedule presented in Module II.

Typical inspection items will include monthly site perimeter & general facility checks for items listed in this Post Closure Plan, such as; well integrity, locks, leachate risers integrity, leachate pump function (during leachate management), site and perimeter security and signage, etc.

Typical landfill cell checks will be performed monthly and after severe weather events to include observation for erosion, standing liquids, subsidence, burrows, and any deterioration of final cover, runoff management systems.

16.2.3.2. Maintenance of Waste Containment Systems

Maintenance of the final cover of any disposal cell shall be performed to comply with the permit conditions stated within. It is expected that an annual maintenance operation will be required to meet the needs of the facility. This annual operation will include replacement of soils lost to erosion which might threaten the integrity of the cover, maintenance of the drainage channels and culverts which direct any run-off away from the unit, controlling burrowing rodents as necessary to counter infestations, and control measures to prevent growth of woody or deep-rooted plants which might damage the integrity of the final cover.

16.2.3.3. Maintenance of the Leachate Management System

Maintenance of the leachate management system will include maintenance of the leachate evacuation pumping systems, temporary leachate storage units and other pertinent portions of the leachate collection/detection systems during such time as leachate is generated in quantities, which are able to be pumped. The leachate is expected to be managed at an appropriately permitted offsite treatment and disposal facility. The leachate collection/detection systems may be expected to occasionally require replacement of pumps and miscellaneous routine maintenance of equipment. These costs are estimated in the CDA.

16.2.3.4. Maintenance of the Groundwater Monitoring System

The groundwater monitoring system will require routine and non-routine maintenance throughout post-closure. It is expected that pump repair and replacement and other minor maintenance will be required and these costs have been included in the semi-annual groundwater monitoring cost.

16.2.3.5. Maintenance of the Security System

The maintenance of the security system for this facility is expected to be minimal due to its remote location. Any security fencing and gates provided will be maintained and warning signs surrounding the facility will be maintained and replaced as necessary to prevent the inadvertent entry of unauthorized personnel.

16.2.4. Post-Closure Care During Facility Operation

It should be noted that there will be numerous units in post-closure status and care while the facility is still operating under the current and future permits. All maintenance and inspections of units in post-closure will be performed during the normal operation of the facility while it is still operational. This cost estimate is, therefore, believed to be conservative.

16.2.5. Post-Closure Contact

The anticipated post-closure contact for the Grassy Mountain facility is stated below. At the time of final closure of the facility any necessary modifications to this designated contact will be made.

Vice President of Operations
Clean Harbors Environmental Services, Inc.
42 Longwater Drive
P.O. Box 9149
Norwell, Massachusetts 02161-9149
(781) 792-5000

16.2.6. Post-Closure Care Notices

The Permittee shall, no later than 60 days after certification of closure of each hazardous waste disposal unit, submit records as delineated by Utah Admin. Code R315-8-7 and 40 CFR 264.119(a) to the local zoning authority and the Director.

In addition, the Permittee shall, within 60 days of certification of closure of the first hazardous waste disposal unit and within 60 days of certification of closure of the last hazardous waste disposal unit, record, in accordance with State law, a notice on the deed which meets the requirements of 40 CFR 264.119(b). A certification that such notice has been executed, as required by 40 CFR 264.119(b)(2) shall be submitted to the Director of the Division of Waste Management and Radiation Control.

16.2.7. Post-Closure Certification

The Permittee shall, no later than 60 days after the completion of the 30 year post-closure period for any hazardous waste disposal unit, submit a certification to the Director, in accordance with 40 CFR 264.120 and Utah Admin Code R315-8-7, stating that all post-closure requirements have been completed in accordance with this plan and any required modifications of same.

17.0 FINANCIAL REQUIREMENTS FOR POST-CLOSURE

The post-closure cost estimates reflect the requirements of Utah Admin. Code R315-8-8 and 40 CFR 264, Subpart H - Financial Requirements. More specifically, this section reflects the necessary modifications to respond to 40 CFR 264.144.

17.1. Post-Closure Care Cost Estimates

The above text provides the information utilized to develop the cost estimates provided in the table below. Additional information is found in Appendix 1, "Cost Documentation Appendix (CDA)".

Table G: Post-Closure Care Cost Estimate Summary

Post-Closure Care Cost Estimate Summary	Annual
Groundwater Monitoring (CLO-5)	$148,905
Leachate Management (CDA) Average Over 30-Years	$44,497
Leachate Collection System Maintenance and Pump Replacements (CDA)	$10,780
Cap Maintenance (CDA)	$9,200
Routine Inspections (CDA)	$7,800
Annual Independent Professional Post-Closure Review/Certification (CDA)	$29,268
Subtotal Estimated Facility Post-Closure Costs =	**$250,450**
Administrative & Contingency Costs (CDA)	$25,045
For Potential RFI's / Corrective Action (CDA)	$25,045
Total Estimated Present (2001 $'s) Annual Post-Closure Care Costs	$300,540
Total Present Worth of Annualized Post-Closure Costs (Annual Costs x Length of PC)	$9,016,205
Total Cost of Final Certification of Post-Closure Activities (CDA)	$42,000
Total Estimated Present Worth of Facility Post-Closure Care Costs =	**$9,058,205**

C. FINANCIAL ASSURANCE MECHANISM

18.0 FINANCIAL ASSURAIRICES

18.1. Financial Assurance for Closure (40 CFR 264.143, 264.146 and Utah Admin. Code R315-15-11 through 12)

In accordance with the regulations cited above, Clean Harbors Grassy Mountain, LLC., as the owner/operator of the Grassy Mountain facility, is required to provide assurances that there will be funds available to close the facility at some time in the future. The purpose of these assurances is to guarantee that closure can be performed by a third party, if for some reason Clean Harbors Grassy Mountain, LLC. is unable to do so itself. As specified in Appendix 1 of this application, the minimum dollar amount to be guaranteed, in 2001 dollars, is $12,438,327. This figure will be updated at least annually in response to inflation, and as often as needed to reflect changes at Grassy Mountain.

There are six different methods allowed by the rules to guarantee the Closure Costs:

- Closure Trust Fund
- Surety Bond Guaranteeing Payment into a Closure Trust Fund
- Surety Bond Guaranteeing Performance of Closure
- Closure Letter of Credit
- Closure Insurance
- Financial Test and/or Corporate Guarantee.

Clean Harbors Grassy Mountain, LLC. shall use one of these as the financial assurance mechanism for the Grassy Mountain facility. The financial assurance documentation or certification of such documentation is maintained at the office of the Division of Waste Management and Radiation Control. Clean Harbors Grassy Mountain, LLC. shall remain in compliance with the applicable provisions of 40 CFR §264.143 and Utah Admin. Code R315-15-11 through 12, as they relate to the mechanism used for the financial assurance mechanism for closure.

18.2. Financial Assurances for Post-Closure (40 CFR 264.144 & 264.146)

In accordance with the regulations cited above, Clean Harbors Grassy Mountain), LLC., as the owner/operator of the Grassy Mountain facility, is required to provide assurances that there will be funds available to maintain the facility through the post- closure period. The purpose of these assurances is to guarantee that post-closure care can be performed by a third party, if for some reason Clean Harbors Grassy Mountain, LLC. is unable to do so itself. As specified in Appendix 1 of this application, the minimum dollar amount to be guaranteed, in 2001 dollars, is $9,058,205. This figure will be updated at least annually in response to inflation, and as often as needed to reflect changes at Grassy Mountain.

There are six different methods allowed by the rules to guarantee Post-Closure Care:

- Post-closure Trust Fund

- Surety Bond Guaranteeing Payment into a Post-Closure Trust Fund
- Surety Bond Guaranteeing Performance of Post-Closure Care
- Post-Closure Letter of Credit
- Post-Closure Insurance
- Financial Test and Corporate Guarantee for Post-closure Care.

Clean Harbors Grassy Mountain, LLC. shall use one of these as the financial assurance mechanism for Grassy Mountain. The financial assurance documentation or certification of such documentation is maintained at the office of the Division of Waste Management and Radiation Control. Clean Harbors Grassy Mountain, LLC. shall remain in compliance with the applicable provisions of 4.0 CFR §264.144 as they relate to the mechanism used for the financial assurance mechanism for post-closure.

18.3. Liability Requirements (40 CFR 264.147)

Clean Harbors Grassy Mountain, LLC. maintains liability insurance for sudden accidental occurrences, as required by the rules cited and Module II.Q.1. of the Clean Harbors Grassy Mountain, LLC., RCRA Permit. The certificate of insurance for the required liability insurance as specified by 40 CFR 264.147 is maintained on file at the office of the Division of Waste Management and Radiation Control.

18.3.1. Variance Procedures and Adjustments by the Regional Administrator

Clean Harbors Grassy Mountain, LLC. has no plans to use variance procedures or adjustments, therefore, this section is not applicable. There are no known adjustments that have been made by either the Regional Administrator or the Director of the Division of Waste Management and Radiation Control.

18.3.2. Use of State Required Mechanisms

The facility is not covered by any State financial mechanism, therefore, this section is not applicable.

18.3.3. State Assumption of Responsibility

This section is not applicable to Clean Harbors Grassy Mountain, LLC.

APPENDIX 1
COST DOCUMENTATION

INVENTORY MANAGEMENT		
General Management Practices		
Re-Containerization of Waste Stream (Source: Americon 2001)		
Estimate Support: It has been assumed that the most common method for waste stream handling would be by containerization in 55 gallon units for transport to off-site disposal. It serves as the more conservative approach even if it is decided at final closure to transport by bulk to the treatment disposal site. Experience indicates that approximately 2% of the containers received at a facility will require re-containerization for a variety of reasons. It is estimated that an additional 1% of all containers transported to other treatment and disposal facilities will require re-containerization due to unexpected damage and shipment effects. Estimate a total 3% will be re-containerized.	$/Drum	200
Fraction of Total Number of Drums	Fraction	0.03
Container Mobilization (Source: Americon 2001)		
Forklift Rental & Operating Cost	$/Workday	$106
Labor (Equipment Operator)	$/Hour	$30
Labor (1 Laborer)	$/Hour	$25
Operated Unit Cost	$/Day	$556
Operated Unit Cost	$/Pallet	$13.90
Estimate Support: Container mobilization consists of pallet loading onto appropriate van type vehicles. Each van typically holds approximately 20 pallets or 80 – 55 gallon drums. It has been assumed that a typical 8 hour workday is consumed to process two complete loads of containerized wastes. Some waste will already be palletized and loaded; therefore it is assumed that only a fraction of any waste stream must be mobilized (palletized) for transport.	Fraction	0.25
Off-Site Management of Containerized Hazardous Waste Inventory		
The only inventory of wastes subject to off-site management is Container Management Facility (Drum Dock 1) waste streams destined for incineration and possible off-site management of leachate liquids. Additionally, it is assumed that a fraction of the remaining Container Management Facility waste inventory destined fro incineration has been assumed.	Fraction	0.10
Transportation Costs: Unit cost of shipments to Aragonite, Utah. Source: Clean Harbors Transportation, 2010.	$10/ Drum	$240/Full van load
Incineration Costs. Source: Aragonite, Utah, incineration facility typical fee 2010.	$/Drum	$350
Off-Site Management of Inventory		
Waste Categories/Estimated Quantities: Based on current record evaluations at the facility, the hazardous waste streams typical to the hazardous waste management units have been categorized by treatment requirements. Quantities will vary and these estimates represent a conservative estimate.		
Stabilization Treatment		
Of the remaining Container Management Facility inventory ("other" inventory), it is assumed that a fraction of these containers will be treated at the stabilization facility prior to ultimate landfill disposal. The waste inventory at the other units typically is liquid suitable for off-site disposition; otherwise solids in the waste inventory will be assumed to be designated for on-site management and require treatment at a stabilization unit prior to landfill disposal.	Fraction	0.40
Stabilization treatment charges including any required neutralization. Source: Current typical Grassy Mountain fees for stabilization, 2010(Includes analytical costs if required.)		
Containers (55 gallon equivalents)	$/Drum	$150
Bulk	$/Yd^3	$180
Direct Landfill Disposal		
The remaining fraction of the inventory of the Container Management Facility will not require any specific treatment and can be transported directly to the landfill for disposal. Note that all inventory will require charges relative to landfill disposal since these charges are not contained within the other treatment unit costs.	Fraction to not be stabilized.	0.60
In order to more accurately assess the cost of landfill disposal, the waste streams treated by stabilization, it	Stabilization	1.6

is assumed that the volume of waste will increase after stabilization. A "stabilization volume factor" applied to the original volume is used to account for the volume increase. This number is based on GM stabilization process experience. It is also utilized in landfill capacity assurance calculations through the Closure and Post-Closure Plan to compute capacity, which must be available at Closure.	Volume Factor	

LANDFILL CAPACITY ASSURANCE		
The current permit for the Grassy Mountain facility requires that the Permittee maintain sufficient landfill capacity to accommodate the appropriate disposal of all hazardous waste inventory as well as all decontamination residuals generated during closure of the facility. Table B contains the tabulation of the required landfill capacity needed to be remaining at closure. The information was obtained from the Worksheets and this CDA.		
Landfill Capacity Assurance (LCA) – Container Management Facility (CMF)		
Conversion factors used to convert from one volume type to another are:		
Gallons to Cubic Yards	Yd^3/55-Gallon	0.27
Cubic Feet to Gallons	Gal/Ft3	7.48
Cubic Yards to Cubic Feet	Ft3/ Yd^3	27.00
Containerized inventory for direct landfill	See CMB.	
Containerized inventory stabilized then landfill disposed.	See CMB.	
LCA Waste Inventory Total Volume	See CMB & Table B	
Landfill Disposal Costs (Source: Grassy Mountain, 2001)		
Costs associated with disposal of inventory and/or decontamination residues after stylization will be the on-site transport and placement within the cell and the cost of the airspace utilized (Grassy Mountain amortized cost of the cell volume).		
Operating labor, equipment, fuels	\$/ton or Yd^3	\$2.00
Amortized cost of airspace (Cell 7)	\$/Yd^3	\$11.51
Unit Landfill Disposal Cost (Bulk)	\$/Yd^3	\$13.51
Unstabilized load of drums	Drums/Yd^3	3.67
Stabilized load of drums	Drums/Yd^3	2.30
Unit Landfill Disposal Cost (Per Unstabilized Drums)	\$/Unstab. Drum	\$3.68
Unit Landfill Disposal Cost (Per Number of Drums to be Stabilized)	\$/3 Stab. Drum	\$5.89
Put-Pile Disposal Costs (Source: Grassy Mountain, 2001)		
Put-piles will vary in size. Some smaller and some larger. Also, a majority of these will be successfully treated with initial stabilization. The cost of disposing of these put-piles is included in the landfill and stabilization costs. The remainder of the put-piles will have to be treated again and disposed. The following assumptions are used to develop the costs for those that have to be treated.		
Maximum number of put-piles	Number	250
Average put-pile size (Source: Grassy Mountain, 2001)	Yd^3	45.00
Fraction of put-piles that must be retreated (Source: Grassy Mountain, 2001)	Fraction	0.20
Average analysis cost (Source:Clean Harbors Kimball, LLC, 2010)	\$/Pile	\$58
Volume increase as a result of stabilization	Factor	1.30
Operating labor, equipment, fuels	\$/ton or Yd^3	\$2.00
Stabilization costs (includes analytical, transportation, analytical review, profit margin)	\$/ Yd^3	\$180
Total Re-Stabilization Costs	\$/ Yd^3	\$182

HAZARDOUS WASTE MANAGEMENT UNIT (HWMU) DECONTAMINATION AND DISPOSAL OF DECONTAMINATION RESIDUES		
For purposes of the Closure Cost Estimate decontamination of the hazardous waste management units and related structures I assumed to be conducted by high-pressure washing. The initial wash-down would be performed with water and appropriate surfactant additives. This will be supplemented with scrubbing with brushes and solution as needed. This effort will be followed by a second complete washing/rinse with water only. Unless analytical sampling of the final rinse waters/residue indicated otherwise, no further decontamination will be performed. All water utilized for decontamination will be delivered to the site by tanker truck to ensure that non-contaminated water is employed in the process. It is assumed that the current potable water system will be the distribution system of this clean water. Cost estimates assume that all wash water will be treated at an off-site facility possessing appropriate permits. The solid residues generated by decontamination are assumed to be a fraction of the liquid decontamination total and are included in the closure plan worksheet section. The text hereinafter presents the "area" to be decontaminated and other pertinent information specific to each hazardous waste management unit and its ancillary equipment. Also included is the estimated quantity of soils removal for decontamination at each unit to be landfilled direct. It is assumed, for estimating purposes, that the soils removal will include the top 6 inches of soil within 6 feet of the outside containment perimeter.		
Protective Clothing and Safety Equipment		
The estimated number of personnel to be outfitted with full protective and safety equipment during closure operations is shown to the right of this text. This includes such operations as the landfill, stabilization, decontamination, drivers, lab operations, leachate treatment and some miscellaneous personnel.	# of persons	34
Protective Clothing, Basic Level B (Source: Americon 2001)		
Splash Suit	$/Item	$10
Chemical Resistant Boots	$/Item	$50
Nitrile Gloves (Disposable)	$/Item	$1.50
Goggles	$/Item	$10
Full-Face Respirator and Cartridges	$/Item	$200
Hard Hat	$/Item	$6
30% Surcharge for Disposable Equipment During Closure	$$Item	$83.25
Total Initial Cost:	$/Person	$360.75
Protective Clothing, Disposable Items (Source: Americon 2001)	Item/Day /Person	1
Splash Suit	$/Item	10
Nitrile Gloves (Disposable)	$/Item	2
Cartridges	$/Item	5
Total Renewing Cost	$/Item	18
Closure Time	Years	2
	Hours/Year	2,080
	Hours/Day	10
	Days	416
Total Renewing Cost for Two Year Closure Period:	$/Person	$7,280
Overview of Decontamination Methods Assumed for Cost Estimating Purposes (Source: Americon 2001)		
High-pressure water wash systems operate at a water production rate of between 2.5 and 6.5 gallons per minute. For estimating purposes, 5 gallons per minute is used, since this seems to be the greater rate within the new generation of wash systems. Note: The following are crew production rates and estimates of resultant residual production estimated in 1991. upon review of these rates of production and associated costs locally, it is believed the listed costs continue to be very conservative estimates of credible current costs to perform this work; therefore no change has been made (Source: Americon, 2001).		
Initial Wash		
Cleaning production is estimated at 1,200 square feet per shift.	Sq. Ft./Shift	1,200
Hours of activity per shift	Hours/Shift	6.5
Production	Sq. Ft./Min.	3
Spray unit residual generation	GPM	5
Residual generation rate	Gal./Sq. Ft.	1.6
Residual generation rate	Gal./Day	1,950

Final Wash/Rinse		
Cleaning production Rate	Sq. Ft./Shift	2,000
Hours of Activity Per Shift	Hours/Shift	6.5
Cleaning Production Rate	Sq. Ft./Min.	5
Spray Unit Residual Generation	GPM	5
Residual Generation Rate	Gal./Sq. Ft.	1.0
Residual Generation Rate	Gal./Day	1,950
Crew/Equipment Overview		
One Laborer Foreman		
Four Laborers		
One Compressor		
Tools, Accessories and Hoses		
Portable Pump (Centrifugal)		
Surfactant/Chemicals		
Total Cost Per Shift (Source: Americon 2001):	$/Shift	$1,368
High-Pressure Washing		
The estimated production of the crew and equipment above for the initial wash.	Sq. Ft./Shift	1,200
Surcharge due to travel distances to the facility and other possible ramifications to cover travel time, mileage, etc.	Fraction	0.30
Estimated cost for the labor portion of the initial decontamination.	$/Sq. Ft.	$1.48
High-Pressure Rinsing		
The final rinse for the facility will be less costly due to higher production and elimination of any surfactant and/or chemicals.		
The estimated production of the crew and equipment above for the initial wash.	Sq. Ft./Shift	2,000
Surcharge due to travel distances to the facility and other possible ramifications to cover travel time, mileage, etc.	Fraction	0.30
Estimated cost for the labor portion of the initial decontamination.	$/Sq. Ft.	$0.89
Wash Water Supply It has been estimated, based on the production rates, that it will be necessary to provide approximately 1,950 gallons of potable water for decontamination each shift. One delivery of water is 10,000 gallons assuming it is stored in the facility's current potable water storage and distribution system.		
Crew (One tanker truck and driver)	$/Day	$720
Crew delivery	Gal.	10,000
Crew (One tanker truck and driver)	$/Gal.	$0.072
Water Cost (Including transportation)	$/Gal.	$0.077
Water Cost	$/Day	$150.15
Wash Water	$/Sq. Ft.	$0.1251
Rinse Water	$/Sq. Ft.	$0.0751
Temporary Decontamination Residue Storage		
Wash and rinse waters both require a vacuum tanker to remove and transport residual wash/rinse waters from the area of decontamination to the leachate storage tanks.		
One tanker truck with driver (5,000 gallons) (Source: MP Environmental 2001)	$/Day	$600
Total Cost of Water, Wash/Rinse and Temporary Storage		
Unit Cost – Initial High-Pressure Decontamination	$/Sq. Ft.	$2.11
Unit Cost – Final High-Pressure Decontamination	$/Sq. Ft.	$1.26
Aqueous Treatment of Residuals		
It is assumed that aqueous residuals would be shipped off-site to the Clean Harbors San Jose facility for treatment and disposal.	$/Gal.	$1.82
Treatment facility costs (SJ Facility, 2010)	$/Gal.	$1.25

Transportation to SJ Facility (Source: Clean Harbors , 2010)	$/Load	$2,872.32
	Gal./Load	5,000
	$/Gal.	$0.57
Container Management Facility Decontamination		
The structure for the Container Management Facility is comprised of the pad, foundations and enclosure structures for Drum Dock 1, Pad 2A, Pad 2B, Pad 3A and Pad 3B. The estimated internal surface area of this facility is 46,511 square feet.	Sq. Ft.	46,511
Time required for initial rinse.	Days	39
Tanker cost for initial rinse.	$	$13,953
Initial rinse cost per Square Foot.	$/Sq. Ft.	$0.50
Time required for final rinse.	Days	23
Tanker cost for final rinse.	$	$13,953
Final rinse cost per Square Foot.	$/Sq. Ft.	$0.50
Decontamination Residues		
Decontamination residues to be managed as a result of the closure of the Container Management Facility are: the aqueous residues and resulting solids residue from the decontamination effort, accumulating at the rates shown below.		
Wash water generation.	Gal.	75,580
Solids generation rate (Fraction of Wash Water)	Fraction	0.05
Solids generation rate [1 gallon = (1/(7.48 x 0.27)) = 0.005 Cubic Yards]	Gal.	3,779
Solids generation rate.	Yd^3	19
Rinse water generation.	Gal.	45,348
LCA	Yd^3	30
Solid residuals (sludges from wash down liquids) volumes are calculated similarly for Waste Management Units other than the Container Management Facility. These calculations are shown on the Worksheets (CLO).		
Removal of any potentially contaminated soils immediately surrounding the Container Management Facility structure has been considered. The quantity of soils (LCA) is estimated to be:	Yd^3	80
Stabilization Tank System Decontamination		
This unit is broken down into tank units and containment/process area for convenience. The approximate surface area of the containment/process area to be decontaminated including the retaining walls and sumps is shown below. The approximate total surface area, interior and exterior, of the double-walled, free-standing, open topped tank units is shown below. For the purposes of this estimate all three of the tanks have been assumed to leak into the leak detection system, requiring dismantling and total decontamination. The increased tank surface area to be decontaminated is shown. The decontamination of these tanks will also generate gravel for landfill disposal and must be accounted for in the LCA.		
Containment	Sq. Ft.	7,825
Tank Exterior (Three Tanks)	Sq. Ft.	3,240
Tank Interior (Three Tanks)	Sq. Ft.	3,240
Total =	Sq. Ft.	14,305
Soils Removal (LCA)	Yd^3	70
Stabilization Tank Demolition/Dismantling (Source: Americon 2001)		
Steel tank demolition is assumed to require oxy/acetylene torch cutting with crane-aided mobilization of the dismantled components or parts. The unit costs presented here are applied to the Waste Stabilization Tanks assumed to require demolition for this estimate. Estimate Support: For the purpose of demolition of a Stabilization Tank, it has been assumed that approximately 246 linear feet of torch cutting will be required to dismantle a tank into manageable proportions. One 10 hour day is estimated to be needed to perform demolition and loading.		
Cost of Torch Cutting (1" Plate, 246 Feet of Cutting)	$/Foot	4
Number of Feet to Cut	Feet	246
Cost of Operated Hydraulic Crane (Source: Americon 2001)	$/Day	$920
Crane Operating Days	Days	1
Unit Cost of Stabilization Tank Demolition	$	$1,904
Number of Tanks to Demolish/Dismantle	Count	3

Leachate Treatment Tank System		
The leachate treatment tank system will remain intact at closure because it will be needed to assist in managing leachate during post-closure. However, the cost to decontaminate these is included in the closure cost estimate to reflect the ultimate closure of this unit. The leachate treatment tank system containment area is a reinforced concrete containment and contains the four storage tanks. The tank surface areas, interior and exterior, are approximated. Tank interior surface area is increased by a factor as a surcharge to account for confined space entry conditions.		
Containment	Sq. Ft.	2,000
Tank Exterior (Two Tanks)	Sq. Ft.	2,014
Tank Interior (Two Tanks)	Sq. Ft.	3,021
Total =	Sq. Ft.	7,035
Soils Removal (LCA)	Yd^3	30
Surface Impoundment unit Decontamination/Dismantling		
Cost estimate assumptions are that the Surface Impoundment Unit A will receive a completed high-pressure wash only on the primary liner, and if necessary, on the back of this liner and necessary areas of the secondary liner if leakage has occurred. The primary linear area to be decontaminated is approximated.	Sq. Ft.	42,480
It has been assumed, for estimating purposes, that no major leakage has occurred and only a fraction of the underside and the secondary liner components require an initial wash/rinse.	Fraction	0.20
Underside and secondary liner components requiring an initial wash/rinse.	Sq. Ft.	8,496
Since the liner and leak detection components will be disposed of in an on-site landfill, these liner components will only receive an initial wash/rinse on visible contamination. It is estimated that approximately 760 cubic yards of liner components will require landfill disposal. After these synthetic components have been rinsed of any visible contamination and properly disposed of, the removal and landfill disposal of any contaminated soils will be performed. For estimating purposes, the quantity established by the initial 1 foot of clay sub-liner and leak detection piping and media has been utilized to establish a cost item.	Yd^3	760
Summary of the estimate quantities of material and areas of decontamination:		
Liner Area	Sq. Ft.	42,480
Underliner Area	Sq. Ft.	8,496
Subtotal:	Sq. Ft.	50,976
Gravel Collection Media (Primary)	Yd^3	10
Synthetic Liner Component Volume	Yd^3	760
Clay Liner Component Volume	Yd^3	1,556
Gravel Collection Media (Secondary)	Yd^3	51
Subtotal (Landfill Capacity Assurance):	Yd^3	2,337
Synthetic Liner Components Removal (Source: Americon 2001)		
The removal of the synthetic liner components is a separate task, not included in the decontamination. The following crew costs cover this demolition by utilizing loaders to pull the pieces out that have been cut and rolled up to be landfilled. The costs of trucking and landfill disposal are detailed in other portions of this cost appendix. Estimate Support: The unit cost per cubic yard is based on an estimate of three (3) days to remove the synthetic components during decontamination. This in turn was applied to the estimated volume of synthetic material to be removed.		
Time to Complete Work	Days	3
Length of Work Day	Hours/Day	10
Laborers	Number	4
Laborers (Unit Cost)	$/Hour	$25
Laborers (Unit Cost)	$/Day	$250
Operators	Number	1
Operators (Unit Cost)	$/Hour	$40
Operators (Unit Cost)	$/Day	$400
Pumps, Hoses, Slings and Supplies	$/Day	$100
One Track Loader (Unit Cost)	$/Hour	$65
One Track Loader (Unit Cost)	$/Day	$650

Total (Unit Cost):	$/Day	$2,150
Total (Unit Cost):	$/ Yd^3	$8.49
Excavation of Potentially Contaminated Soils (Source: Americon 2001)		
Excavate material and load to haul vehicle. Haul vehicle cost is included in disposal cost.		
Front-End Loader or Backhoe (Fueled and Operated)	$/Hour	$70
Front-End Loader or Backhoe (Fueled and Operated)	Yd^3/Hour	60
Front-End Loader or Backhoe (Fueled and Operated)	$/ Yd^3	$1.17
Site Regarding/Restoration (Source: Americon 2001)		
Site regarding includes replacement of soils from on-site locations during decontamination efforts at all units. The quantities utilized coincide with the volume of soils designated for landfill disposal in the decontamination section.		
Unit Cost of Borrow Soil Excavation and Haul	$/ Yd^3	$3.10
Unit cost of Site Regrading	$/ Yd^3	$1.23
Total (Unit Cost):	$/ Yd^3	$4.33

FINAL COVER AND LANDFILL CLOSURE		
Landfill closure requires a closure application for plan approval prior to closure certification. This application must include pertinent modifications to the existing closure document and any other supporting technical information to meet the regulatory requirements. The cost estimate provided in this document is based on actual square foot Closure Costs of three typical Geosynthetic Clay Liner (GCL) Closure design installations conducted in 1997. This cost information includes all consultants, staff and other pertinent costs that could be related to the typical closure of a hazardous waste landfill cell. This includes: Design, Engineering, Permitting, Miscellaneous, Administrative, Compaction of Mounded Waste, Waste Grading, GCL Compatible Bedding Material Procurement, Transportation, Placement and Grading, Geosynthetic Components (GCL, high Density Polyethylene Geomembrane, Drainage Net, Geotextile Filter Fabric), Compacted clay Cover (where required around the cell cap perimeter, compacted clay includes borrow, processing, stockpiling, haul, placement, grading and maintenance), GCL Compatible Soil Protective Cover Procurement, Transportation, Placement and Grading, Rock Armor Plate, Drainage Run-Off Control, Field Engineering, QA/QC, Testing, surveying, and Engineers Certification (See CDA-Landfill Closure and Cell Closure Quantity Estimate Tables for Details).		
Cell 4		
Approximate North/South Dimension	Feet	490
Approximate East/West Dimension	Feet	1,709
Approximate Cap Surface Area	Sq. Ft.	528,608
Closure Cap Cost (2001 $'s) (See CDA-Landfill Closure and Cell Closure Quantity Estimates)	$	$2,213,739
Cell 5		
Approximate North/South Dimension	Feet	710
Approximate East/West Dimension	Feet	750
Approximate Cap Surface Area	Sq. Ft.	532,576
Closure Cap Cost (2001 $'s) (See CDA-Landfill Closure and Cell Closure Quantity Estimates)	$	$2,180,905
Cell 7		
Approximate North/South Dimension	Feet	830
Approximate East/West Dimension	Feet	830
Approximate Cap Surface Area	Sq. Ft.	688,900
Closure Cap Cost (2001 $'s) (See CDA-Landfill Closure and Cell Closure Quantity Estimates)	$	$2,630,675
TOTAL ESTIMATE:		**$7,025,319**

GROUNDWATER MONITRONG DURING CLOSURE/POST-CLOSURE		
As defined in Module VII, groundwater monitoring will be performed annually during closure and post-closure. Four (4) will take place during closure and 60 during post-closure. The detection monitoring system for RCRA units at Grassy Mountain consists of 37 wells including background wells. Each well is sampled for complete Class 1 and Class 3 analyses. The QA/QC requires 10% duplicate analysis for each sampling event. In addition, there is normally one volatile constituent blank for each day of sampling and one field blank for each week of sampling. Each sampling event requires a three person crew at approximately 10 hours per day for nine days. Each monitoring event requires supporting documentation of the sample analysis and the event records to support such aspects as QA/QC at the site and laboratory as well as the numerous other aspects of the event. The records must also be developed into the necessary format for submittal to the regulatory personnel. Sample analytical costs are listed separate.		
Wells	Number	37
Sample Days Per Well	Days	0.24
Sample Days Per RCRA Event	Days	9
Samples Per Well Per Sample Event	Count	1
Duplicate Samples Per Sample Event	Count	6
Volatile Samples (Duplicates)	Count/Day	1
Field Blanks (One/Week)	Count	2
Background Wells	Count	4
RCRA Downgradient Wells	Count	20
Industrial Waste Cell 3 Downgradient Wells	Count	3
PCB Cell Downgradient Wells	Count	21
Total Wells	Count	58
Total RCRA Wells, Including Background Wells and TSCA Wells Being Monitored	Count	55
The groundwater monitoring effort for all RCRA wells is provided from an outside source for Grassy Mountain and includes analytical costs from Accutest (Source: Cameron-Cole & Accutest2010)	$/Year	$99,496
Per well costs for groundwater monitoring efforts are based on the fact that RCRA and background wells are monitored annually.	$/Well/Year	$928
Well maintenance for all wells is estimated (Source: Cameron-Cole)	$/Year	$1,000
Well maintenance for RCRA wells	$/Year	$603

ANCILLARY CLOSURE ACTIVITIES		
Leachate Management		
Leachate management involves the removal, storage and assumed off-site transport to the Clean Harbors Aragonite facility for all leachate expected to be generated during the closure period. The current operation pumps the leachate from all cells to a portable tank unit that is transferred to the leachate storage tanks until transport off-site. For cells closed as of December 1999, the leachate volume for the closure time period of the other cells is assumed to be the same as the leachate volume produced in December 1999.		
Leachate generation volume is derived from historical experience (January 1999 through December 1999). These rates are presented below. This assumption is conservative since closed landfill cell leachate generation rates will decrease over time after closure. The assumed volumes are applied against the expected 24-month closure period to obtain the estimated annual volume (365 days x gal/day x 6 RCRA cells and 2 IWC's handled as RCRA).	Days/Year	365
IWC1	Gal./Day	55.9
IWC2	Gal./Day	0.1
RCRA Cell 1	Gal./Day	0.9
RCRA Cell 2	Gal./Day	11
RCRA Cell 3	Gal./Day	0.9
RCRA Cell 4	Gal./Day	271.2
RCRA Cell 5	Gal./Day	261
RCRA Cell 7	Gal./Day	716
Total leachate collected per day	Gal./Day	1,317
Total leachate collected per week	Gal./Week	9,219
Leachate Collection and Storage Costs – Truck, Tank and Driver (Source: Americon 2001)	$/Day	$200
Hours Operated Per Day	Hours/Day	10
Days Per Week	Days/Week	4
Total	$/Week	$800
Unit Cost of Leachate Collection	$/Gal.	$0.09
Run-On/Run-Off Control Maintenance (Source: Americon 2001)		
Run-On/Run-Off control maintenance involves the routine maintenance of the erosion and degradation of the landfill or other required cover structures, run-off trenches and piping and any collection basins at the facility. It has been estimated (worst case) that within the overall 24-month closure schedule, approximately one full crew day per month would be utilized for routine maintenance. The maintenance crew is comprised of the following (8 hours per day):		
1 Laborer	$/Hour	$25
1 Operator	$/Hour	$30
1 Backhoe/Loader	$/Hour	$65
Hourly Cost of Maintenance Crew	$/Hour	$120
Unit Cost of Maintenance Crew (8 Hour Day)	$/Day	$960
Frequency of Maintenance	Days/Month	1
Security and Inspection		
Security and site inspection is expected to be maintained as currently required during the active site closure (i.e. decontamination, cover placement, etc.) of the facility. This would require 24-hour security at the main gate. It is expected that this will be necessary during the first 12 months of closure. Since the remainder of the closure effort (placement of landfill final cover) will take place after all probably exposure to hazardous constituents has been removed no continuation of security at this level is expected. The cost of security personnel including all payroll and overhead requirements have been computed as follows:		
Security Coverage	Hours/Day	24
Security Coverage	Days	365
Fraction associated with RCRA Cells (8 RCRA out of 12 Cells)	Fraction	0.67
Unit Cost of Personnel (Source: APS, 2000)	$/Hour	$17.80
Mobilization/Demobilization of Heavy Equipment		

It is expected that the heavy equipment to be utilized in the closure process will already be on site for other closure activities, therefore no mobilization or demobilization costs have been added for container management facility closure. The heavy equipment expected to be utilized in the general process is listed below (for estimating purposes it has been assumed that all equipment must be hired). Some equipment may not be listed herein since its function will be mobilization over public highway, and thus mobilization is part of its function and has been included in the cost estimate. Current mobilization cost for tractor/flatbed trailer transport from Salt Lake City (obtained from Knight Transportation, 1999) is $375/one-way or $750 per trip. The total mobilization cost can then be multiplied by 2 to include the demobilization of equipment. Conservatively, typical mob/demob for each piece of heavy equipment would not exceed $1,500 (Source: Americon, 2001)		
Unit Charges	$/Round Trip	$1,500
Number of Trips	Count	6
Closure Cost	**$**	**$9,000**
Site Regrading (Source: Americon, 2001)		
Includes replacement soils from on-site locations.		
Borrow soil excavated and haul.	$/ Yd^3	$3.10
Site Regrading	$/ Yd^3	$1.23
Unit Cost	$/ Yd^3	$4.33
Replacement Volumes (Soils removed from around containment areas).	Yd^3	200
Replacement Volume Surface Impoundment	Yd^3	1,556
Sump Testing (Hydrostatic) (Source: Americon, 2001)		
Since most of the labor, equipment and materials will be available for the sump testing, a lump sum estimate ($/test) has been established. The engineering technician costs associated with the testing have been included in the closure certification costs. A total of 11 sumps are attributed to the areas being closed as part of this site-wide closure.		
Number of Sumps	Count	11
Unit Cost	$/Test	$200
Equipment Decontamination (General)		
Decontamination of equipment used in closure and HWMU decontamination activities will be performed at a truck wash area of the facility. For estimating purposes, each piece of equipment (or group of small tools/equipment) is considered a “unit”. Each unit is estimated to have a constant surface area. The estimates for water generated to decontaminate containment areas is used to calculate the cost of decontamination.		
Areas Per Unit Decontaminated	Sq. Ft.	500
Usage Per Area (Initial and Final Rinse)	Gal./Sq. Ft.	2.6
Quantity of Water Per Unit	Gal.	1,300
Unit Cost	$/Sq. Ft.	3.37
Cost Per Unit of General Decontamination	$/Unit	1,686
The following list provides typical units assumed to require decontamination at completion of closure operations. The decontamination residuals generated will be treated and disposed in accordance with other sections of this document.		
Tank Trucks	Count	2
Haul Trucks (20 Yards)	Count	8
Roll-Off Boxes	Count	24
Vacuum Trucks	Count	1
Front-End Loader	Count	1
Bulldozers	Count	2
Backhoes	Count	1
Unit of 4 Pumps and 200 Feet of Hoses	Count	1
Lift Trucks	Count	1
Compactors	Count	1
Tota l Number of Units	Count	42
Truck Wash Station Decontamination		

At completion of facility decontamination and equipment/general decontamination, the truck wash unit will be decontaminated. This area is not a formally permitted unit but is ancillary to permitted units and a requirement of normal housekeeping practices by Grassy Mountain. The decontamination residuals generated will be treated and disposed of in accordance with other sections of this document. The unit may remain "in-service" after decontamination. The area to be decontaminated is about 5,500 square feet (55 x 100 feet). It is assumed that the contiguous soils and gravel ramps into and out of the units (20 x 40 feet x 4 ramps) will be removed to a depth of two feet and disposed on-site. This volume is calculated to be approximately 237 cubic yards of solids for landfill disposal.		
Area to be Decontaminated (55 x 100 feet)	Sq. Ft.	5,500
Soils Excavation From Ramps (20 x 40 feet x 4 ramps)	Sq. Ft.	3,200
Depth of Soil Excavation	Feet	2
Volume of Excavated Soil	Yd^3	237

CLOSURE CERTIFICATION		
Decontamination verification will be performed to support the closure certification. For Closure Cost Estimate purposes, it has been assumed that sampling and analysis of grab samples from rinse waters from final decontamination efforts will be used to confirm decontamination even though other methods may be used.		
Sampling to Confirm Decontamination		
The number of rinse water samples is based on the number of tanks and the number of containment areas. The number of soil random, 50 foot interval, grab sample basis. A breakout of samples is shown below. Note, it is assumed that the entire one half acre beneath the surface impoundment will be sampled after removal utilizing a 50 foot grid spacing. In addition, 10 random samples are assumed to be taken of the "clean" water prior to using it for the decontamination process to establish background levels.		
Container Management Facility Samples	Water	6
Container Management Facility Samples	Soil	20
Container Management Facility PCB Samples	Water	10
Container Management Facility PCB Samples	Soil	55
Stabilization Tank System Samples	Soil	18
Stabilization Tank System Samples	Water	6
Stabilization Tank System PCB Samples	Soil	20
Stabilization Tank System PCB Samples	Water	5
Leachate Treatment Tank System Samples	Soil	4
Leachate Treatment Tank System Samples	Water	2
Surface Impoundment Unit A Samples	Soil	25
Surface Impoundment Unit A Samples	Water	1
Background Samples	Water	10
Estimated Total Soil and Water Samples:		**182**
Rinse Water Analysis to Confirm Decontamination and Soil Analysis (Source: STL, 2001) For estimating purposes all liquid samples will be analyzed for appropriate 40 CFR Part 261 Appendix IX – Hazardous Constituents. For estimating purposes, all soil/solids samples will be analyzed in the same manner as the liquid samples with the additional Method 1311 TCLP analysis for appropriate parameters contained in 40 CFR Part 261, Appendix IX. Sampling costs are not presented as separate costs since it is expected that certification personnel will be providing this service as part of the certification documentation. PCB Soil/Wipe or Liquid samples cost of analysis is confirmed by Clean Harbors Kimball, LLC,2010.		
Unit Cost (Liquid Sample for PCB)	$/Sample	$39
Unit Cost (Soil/Wipe Sample for PCB)	$/Sample	$39
Unit Cost (Liquid Sample)	$/Sample	$650
Unit Cost (Soil/Solid Sample)	$/Sample	$650

Certification Documents by Independent Professional Engineer		
Inspection is not required during inventory processing and is not necessarily continuous during decontamination efforts. However, to be conservative, continuous inspection time by the engineering certification staff for the closure decontamination effort is estimated to be 12 hours per shift (day), considering site location and tasks (60 hours per week). The estimated duration of decontamination efforts is 75 shifts, or a maximum of 75 days, at 1 shift per day. This is 15 weeks broken down into 5 weeks for Container Management Facility and 10 weeks for the balance of the site wide closure activities. For a project of this magnitude, it would be unreasonable to expect that efficiencies would not be built into the project planning; therefore it is assumed that "concurrent" closure of the Container Management Facility would occur while the site wide closure takes place. However, the closure certification for the CMF is costed separately as if it were to occur independent of the site wide closure. Supervision of closure inspections by the certifying Professional Engineer (PE) is estimated to be approximately 10 hours per week (10 x 10 = 100 hours). Initial permit review and final report preparation is also estimated at 10 hours per week additional, for a total PE estimate of 200 hours. Other engineering staff (ES) task contributions are expected to be 50% of the effort spent on site inspection tasks. Thus 50% of 600 hours and 200 hours equals 400 hours. Clerical staff (CS) assistance per week of inspection time is estimated to be approximately 15 hours per week (15 x 10 = 150 hours). Note – task estimates have been provided based on experience and project comparisons with other closure activities. The certification and QA/QC inspection for landfill closure has been included in the cost of the final cover of each open cell, therefore no costs attributable to this activity have been included.		
Number of Weeks	Weeks	10
Shifts Per Week	Shifts/Week	5
On-Site Engineering Staff Inspection Time (Site Closure – CMF concurrent with site wide closure)	No. Shifts	50
	Hours/Shift	12
	Hours	600
On-Site Engineering Staff Inspection Time (CMB Closure)	No. Shifts	25
	House/Shift	12
	Hours	300
Professional Engineer (PE) Supervision of Closure Inspections	Hours/Week	10
Professional Engineer (PE) Permit Review and Final Report Preparation	Hours/Week	10
Professional Engineer (PE)	Hours	200
Engineering Staff (ES) Support Functions	Fraction of Site Inspections	0.50
Engineering Staff (ES) Support Functions	Hours	400
Clerical Staff (CS)	Hours/Week	15
Clerical Staff (CS)	Hours	150
It is expected that the inventory management and facility decontamination will take approximately 130 crew days. The estimates included herein have been based on decontamination efforts only as it is not necessary to witness inventory management as those activities are the current ones performed under the permit. The estimate can be affected substantially downward by an increase in number of crews to shorten the calendar time required for closure and thus time required for closure certification inspectors to be on-site.	Crew Days	130
Site Wide Certification Summary		
ES (85 Crew Days)	$	$85,000
PE (125 Crew Days)	$	$25,000
CS (27 Crew Days)	$	$4,050
Subtotal	$	114,050
Miscellaneous Expenditures (Fraction of Total)	Fraction	0.15
Miscellaneous Expenditures	$	$17,108
Total Estimate	$	$131,158
CMB Cost Summary		
Note – Container Management Facility Cost, if separate, is half of this estimate based on a 5 week duration. (Fraction of Site Wide)	Fraction	0.50
Total Estimate CMB	$	$65,579
Landfill Capacity Assurance		

Sufficient landfill capacity must be remaining to maintain commitments for landfilling inventory and residuals destined for on-site disposal. This quantity is tabulated (based on calculations shown in the Worksheets) in the body of the Closure Plan within Table B.		

POST-CLOSURE COST CONSIDERATIONS		
Leachate Management System Maintenance (Source: Americon, 2001) Leachate system maintenance primarily involves transportation and the replacement and reconditioning of the leachate collection and detection system evacuation pumps and miscellaneous related items. The replacement/reconditioning of half the pumps is estimated to be necessary every three years. The total number of leachate collection pumps at the existing facility is 82. Approximately 14 pumps would be expected to need replacement annually.		
Leachate pumps (RCRA)	Count	82
Pumps Replaced Per Year	Count	14
2 Laborers for 3 Hours at $35/hour	$	$210
Pump Replacement Costs	$	$560
Single Pump Replacement Cost	$	$770
Estimated Annual Cost of Leachate Pump Replacements:	**$/Year**	**$10,780**
Leachate Pumping and Disposal Costs For the cells already closed during preparation of this plan, assume the leachate volumes collected will continue to decrease at the rate they have been decreasing for the past two years. It is assumed that he first two years of post closure will produce volumes of leachate equal to those assumed for the two-year closure period. The third year of post closure is assumed to have leachate produced at a rate equal to December 1999 and then to decrease from that volume at the same rate as from the high volume in 1999 to December 1999. There has been no significant precipitation from August 1999 to December 1999, so these volume decreases should be indicative of the volume produced when the cells are closed.		
Leachate reduction rate (Years 3-10) (% Reduction Per Year)	%	0.10
December 1999 Leachate Volumes		
IWC1	Gal./Day	55.9
IWC2	Gal./Day	0.1
RCRA Cell 1	Gal./Day	0.9
RCRA Cell 2	Gal./Day	11.0
RCRA Cell 3	Gal./Day	0.9
RCRA Cell 4	Gal./Day	164.8
RCRA Cell 5	Gal./Day	210.3
RCRA Cell 7	Gal./Day	133.4
Total Leachate Collected / Day	Gal./Day	577
Total Leachate Collected / Year	Gal./Year	210,715
Average Reduction in Leachate Volumes (September to December 1999)		
IWC1	Gal./Day	1.53
IWC2	Gal./Day	0.07
RCRA Cell 1	Gal./Day	0.01
RCRA Cell 2	Gal./Day	2.51
RCRA Cell 3	Gal./Day	0.35
RCRA Cell 4	Gal./Day	67.88
RCRA Cell 5	Gal./Day	53.75
RCRA Cell 7	Gal./Day	113.73
Total Leachate Collected / Day	Gal./Day	239.83
Total Leachate Collected / Year	Gal./Year	87,537.95
Leachate Collection and Disposal Costs	$/Gal.	$0.99
Year 1 of Post-Closure	$	$390,363
Year 2 of Post-Closure	$	$390,363
Year 3 (December 1999 Volumes Annualized) (210,714.50 Gallons/Year)	$	$179,157
Year 4 (123,176.55 Gallons/Year)	$	$104,729
Year 5 (35,638.60 Gallons/Year)	$	$30,301
Year 6 (Labor Costs to Check Sumps)	$	$9,600

Year 7	$	$9,600
Year 8	$	$9,600
Year 9	$	$9,600
Year 10	$	$9.600
Years 11-30	$	$192,000
Total Post-Closure Leachate Management:	**$**	**$1,334,915**
CAP (Final Cover Run-Off Control) Maintenance (Source: Americon, 2001)		
Cap maintenance involves the routine maintenance of the erosion and degradation of the landfill covers or other required cover structures, run-off trenches and/or piping and any collection basins at the facility. The number o crew days required annually for routine maintenance is base on the overall post-closure schedule.		
Crew Days Per Year	Days/Year	8
Hourly Cost of Maintenance Crew	$/Crew	$115
Length of Day	Hours	10
Daily cost of Maintenance Crew	$/Crew Day	$1,150
Estimated Annual Cost for Cap Maintenance:	**$/Year**	**$9,200**
Routine Inspections (Source: Americon, 2001)		
Security and site inspection is expected to be performed as a function of facility maintenance. This would require one 10-hour workday once per month during the post-closure period. It is expected that this effort will coincide with the annual administrative/certification report of compliance with the post-closure requirements. Any reporting effort will be coordinated with the appropriate authorized party during the post-closure period.		
Inspection Time	Hrs./Month	10
Unit Cost of Personnel	$/Hour	$65
Estimate of Annual Cost of Routine Inspections:	**$/Year**	**$7,800**

ANNUAL POST-CLOSURE CERTIFICATION AND ADMINISTRATION		
Annual Certification/Administration Report		
During the post-closure period an annual report will be prepared by the Permittee or designated third-party which documents all of the activities for each hazardous waste management unit (HWMU) at the facility during each one year period. These documents will include copies of all other reporting requirements delineated herein including site inspections, leachate generation, manifest documents for leachate management, groundwater monitoring results, etc. These documents will be maintained at a designated repository for use by the certifying authority at the end of the 30-year post-closure period for each HWMU. For estimating purposes, this report is assumed to be prepared by the Independent Professional Engineer documenting the post-closure activities. The following information is the estimate for effort in complying with this requirement.		
Annual Independent Professional Review (Source: Americon, 2001)		
The post-closure activities inspection time Engineering Staff (S) is estimated to be 180 hours per year considering site location and task delineated herein above. Inspection/management time annually by a Professional Engineer (PE) is estimated to be approximately 20 hours. Other technical staff (ES) support task contributions are expected to be 50% of the effort spent on site inspection tasks.		
ES	\$/Hour	\$85
ES Post-Closure Inspection Time	Hours	180
ES Support Functions	Hours	90
Total ES Costs:	**\$/Year**	**\$22,950**
PE	\$/Hour	125
PE	Hours	20
Total PE Costs:	**\$/Year**	**\$2,500**
Subtotal:	**\$/Year**	**\$25,450**
Miscellaneous Expenditures (Fraction of Subtotal)	Fraction	0.15
Miscellaneous Expenditures	\$/Year	\$3,818
TOTAL FINAL POST-CLOSURE CERTIFICATION:	**\$/Year**	**\$29,268**
Certification Documents by Independent Professional Engineer (Source: ERM, 2001)		
The final certification for each HWMU to meet the requirements of Utah Admin. Code R315-8-7 will be compiled utilizing the annual documents outlined herein before. It is expected that this review will require approximately 30 hours by professional staff for each unit as the 30-year period is completed. In addition to this will be the required administration and documentation to accompany the certification, which is estimated to cost approximately 40% of the professional staff fees. There are currently 8 units, which will be subject to post-closure certification. This is a one-time cost.		
HWMU Post-Closure Certification		
Professional Engineer	Hours/Unit	30
Professional Engineer	\$/Hour	\$125
Total PE	\$/Unit	\$3,750
Miscellaneous Expenditures (Fraction of Subtotal)	Fraction	0.40
Miscellaneous Expenditures	\$/Unit	\$1,500
Total unit Cost of Post-Closure Certification	\$/Unit	\$5,250
Number of Post-Closure units	Count	8
Estimated Total Cost of HWMU Post-Closure Certification	\$	\$42,000
Administrative and Contingency Costs	**Fraction**	**0.10**
Contingency for Potential RFI's / Corrective Action	**Fraction**	**0.10**
Length of Post-Closure	**Years**	**30**

CDA – Landfill Closure	Unit Cost	Unit	RCRA Cell 4 (Closure)		RCRA Cell 5 (Closure)		RCRA Cell 7 (Closure)	
			Qty[1]	Total Cost	Qty[1]	Total Cost	Qty[1]	Total Cost
Mobilize/Demobilize	200,000	EA	1	$200,000	1	$200,000	1	$200,000
Subgrade Preparation	1.00	SY						
Embankment	5.00	CY						
Clay Liner-New Cell	12.00	CY						
Clay Liner-Closure	17.00	CY	13,100	$222,700	11,700	$198,900	13,300	$226,100
Clay Soils Placement (Cost includes finishing.)	11.00	CY	4,900	$53,900	4,400	$48,400	5,000	$55,000
60 mil HDPE (Cost includes 8 mil liner.)	3.18	SY	70,341	$223,685	69,966	$222,492	89,392	$284,267
GCL	4.08	SY	59,151	$241,335	59,599	$243,163	77,087	$314,516
Geotextile	1.44	SY	62,421	$89,886	62,893	$90,566	81,350	$117,144
Geonet	1.94	SY	62,421	$121,096	62,893	$122,012	81,350	$157,820
Perimeter HDPE Weld	2.25	LF	3,268	$7,353	2,920	$6,570	3,320	$7,740
Excavate Anchor Trench	7.00	LF	3,268	$22,876	2,920	$20,440	3,320	$23,240
Leachate Collection	50,000	EA	1	$50,000	1	$50,000	1	$50,000
Imported Sand	14.00	CY	11,600	$162,400	11,700	$163,800	15,200	$212,800
Protective Soil Cover	6.00	CY	38,100	$228,600	38,000	$229,800	49,600	$297,600
Drainage (Covers Misc. from Quantity Estimates)	75,000	LS	1	$75,000	1	$75,000	1	$75,000
Road Base Placement	7.50	CY	160	$1,200	150	$1,125	170	$1,125
Gravel Armor	8.50	CY	7,300	$62,050	7,400	$62,900	9,600	$81,600
Subtotal				**$1,712,081**		**$1,685,168**		**$2,053,832**
Design, QC, QA, PM, Survey	22	%	22	$376,658	22	$370,737	22	$451,843
Final Waste Grading	75,000	EA	1	$75,000	1	$75,000	1	$75,000
Security	50,000	LS	1	$50,000	1	$50,000	1	$50,000
TOTAL				**$2,213,739**		**$2,180,905**		**$2,630,675**

[1] See CDA Cell Closure Quantity Estimates.

CDA Cell Closure Quantity Estimates
(Factors Determined Using the Surface Area and Perimeter Lengths of Each Cell)

			Cell 4	Cell 5	Cell 7	IWC 1		IWC 2		Cell Y			
Perimeter (Feet)			3,268	2,920	3,320	2,674		2,777		2,240			
Area (Sq. Ft.)			528,608	532,576	688,900	242,136		338,077		313,000			
Item Description	**Qty. Factor**	**Apply Factor To:**					**Factor**		**Factor**		**Factor**	**Avg. Factor**	**Use Factor**
Earthwork													
Imported Sand Material (Yd3)	0.0220	Area	11,600	11,700	15,200	4,378	0.01808	8,245	0.02439	7,450	0.0238	0.0221	0.0220
Clay Liner Placement (Yd3)	4.0000	Perimeter	13,100	11,700	13,300	4,238	1.58489	3,557	1.28088	13,265	5.91923	2.9283	4.0000
Clay Liner Finishing (Yd3)	3.0000	Perimeter	9,800	8,800	10,000	5,216	1.95064	4,925	1.7735	7,774	3.46899	2.3977	3.0000
Clay Soil Material (Yd3)	1.5000	Perimeter	4,900	4,400	5,000	2,216	0.82872	2,202	0.79294	4,261	1.90138	1.1743	1.5000
Anchor Trench (Linear Feet)	1.0000	Perimeter	3,300	2,900	3,300	2,674	1	2,777	1	2,241	1	1.0000	1.0000
Imported Soil Cover (Yd3)	0.0720	Area	38,100	38,300	49,600	17,260	0.07128	25,180	0.07448	21,840	0.06978	0.0718	0.0720
Gravel Armor Plating (Yd3)	0.0139	Area	7,300	7,400	9,600	3,370	0.01392	4,670	0.01381	4,360	0.01393	0.0139	0.0139
Road Base (Yd3)	0.0500	Perimeter	160	150	170	120	0.04488	140	0.05041	120	0.05355	0.0496	0.0500
Miscellaneous													
Drainage Pipe – 18# Dia. Linear Foot	0.3500	Perimeter	1,140	1,020	1,160	1,284	0.48018	1,146	0.41268	350	0.15618	0.3497	0.3500
Inlet Boxes (Each)	0.0017	Perimeter	6	5	6	4	0.0015	6	0.00216	3	0.00134	0.0017	0.0017
Manholes (Each)	0.0012	Perimeter	4	4	4	4	0.0015	3	0.00108	2	0.00089	0.0012	0.0012
Outlet Structures (Each)	0.0003	Perimeter	1	1	1	0	0	0	0	2	0.00089	0.0003	0.0003
Geosynthetics													
60-mil HDPE Liner (Sq. Ft.)	0.9750	Area	515,400	519,300	671,700	235,557	0.97283	341,226	1.00931	294,714	0.94158	0.9746	0.9750
60-mil HDPE Textured Liner (Sq. Ft.)	20.000	Perimeter	65,400	58,400	66,400	34,317	12.8336	33,600	12.0994	51,940	23.1772	16.0367	20.000
Drainage Net (Sq. Ft.)	0.9750	Area	515,400	519,300	671,700	235,557	0.97283	341,226	1.00931	294,714	0.94158	0.9746	0.9750
Geotextile Fabric (Sq. Ft.)	0.9750	Area	515,400	519,300	671,700	235,557	0.97283	341,226	1.00931	294,714	0.94158	0.9746	0.9750
Geosynthetic Clay Liner (Sq. Ft.)	0.9240	Area	488,400	492,100	636,500	220,113	0.90905	325,080	0.96156	282,240	0.90173	0.9241	0.9240
8-mil Poly Membrane (Sq. Ft.)	5.0000	Perimeter	16,300	14,600	16,600	12,987	4.85677	13,626	4.90673	11,151	4.9759	4.9131	5.0000

D. PCB COMMERCIAL STORAGE CLOSURE COST ESTIMATE

19.0 ANNUAL REVIEW OF INITIAL COST ESTIMATE

This section includes the estimated cost of closure activities including the sampling, transportation, disposal, equipment costs and labor involved in such activities. The costs used for disposal reflect current industry pricing as of the date of this revision. The cost of closure estimates shall be adjusted annually for inflation and may be adjusted for changes in market conditions.

20.0 CLOSURE COST ESTIMATE

The PCB and used oil sample analysis costs for various media (e.g. oil, water, soil, wipe) are based on quotations received from one or more suitable laboratories, as defined in Section 1.2 of the Waste Analysis Plan. Uncoated concrete surfaces will be sampled using destructive core sampling. Coated (impervious) concrete surfaces will be wipe sampled if in good condition.

20.1. Tank Farm

20.1.1. PCB Oil (TSCA) and Used Oil (RCRA) Disposal Charges

(a) Askarel PCB Oil / Used Oil Disposal by Incineration at Aragonite:	
53,325 Gallons x 13.5 lb./Gallon	= 719,888 lbs.
719,888 lbs. x $0.12/lb[2]	= $86,387
(b) Askarel PCB Oil / Used Oil Transportation To Aragonite:	
$600 per Day[3] / 2 Loads per Day	= $300 / Load
$300 / Load / 40,000 lbs. / Load	= $0.008 / lb.
719,888 lbs. x $0.008 / lb	= $5,759
(c) Water Disposal by Incineration at Aragonite:	
10,657 Gallons x 8.3 lbs. / Gallon	= 88,453 lbs
88,453 lbs. x $0.16 / lb.[1]	= $14,152
(d) Water Transportation To Aragonite:	
$600 per Day / 2 Loads per Day	= $300 / Load
$300 / Load / 40,000 lbs. / Load	= $0.008/lb
88,453 lbs. x $0.008 / lb.	= $708
(e) Personnel: [4]	
Supervisor (1) x 5 days x $450 / Day	= $2,250
Labor to load tanker provided by transportation company	
Sub-Total PCB Oil Disposal Charges	**= $109,255**

[2] Market PCB Incineration Prices per September 2001 Correspondence with EPA Region 8.
[3] MP Environmental, 2001.
[4] Americon, 2001.

20.1.2. Bulk Tank Disposal

(a) Bulk Tank Disposal at Grassy Mountain	
Assume tanks weigh 1.5 lbs. / Gallon of Capacity. (i.e. Each 10,000 gallon tank weighs 15,000 lbs. when empty.)	
63,590 Total Tank Farm Gallons x 1.5 lbs. / Gal.	= 95,385 lbs.
95,385 lbs. x $0.04 / lb.	= $3,815
(b) Transportation to Grassy Mountain Cell	
$600 per Day[2] / 2 Loads per Day	= $300 / Load
$300 / Load / 40,000 lbs. / Load	= $0.008 / lb.
95,385 lbs. x $0.008 / lb.	= $ 763
(c) Removal [3]	
Technicians (2) x 2 Days x $400 / Day	= $1,600
(d) Crane [3]	
2 Days x $850 / Day (Includes Crane Operator)	= $1,700
"Landfill Capacity Assurance" Required at Closure: (95,385 lbs. x 0.000075 Yard^3/lb. of Carbon Steel)	**7.5 Yards**
Sub-Total Bulk Tank Disposal	**= $7,878**

20.1.3. Area Decontamination - Concrete Removal

This section describes the decontamination and concrete removal of Tank Farm Containment Area with a volume of 9,099 ft^3.

(a) Concrete Breaker [3]	
$250 / Day x 5 Days	= $1,250
(b) Loader [3]	
$175 / Day x 5 Days	= $875
(c) Disposal at Grassy Mountain	
9,099 ft^3 / 27 ft^3 per Yd^3	= 337 Yd^3
337 Yd^3 x 3,000 lbs. / Yd^3	= 1,011,000 lbs.
1,011,000 lbs. x $0.04 / lb.	= $40,440
(d) Transportation to Grassy Mountain Cell	
$600 per Day [2] / 2 Loads per Day	= $300 / Load
$300 / Load / 40,000 lbs. / Load	= $0.008/lb
$0.008 / lb. x 1,011,000 lbs.	= $8,088
(e) Sampling	
Take 55 underlying soil samples after concrete removal to confirm clean.	
55 Samples x $39 per Sample [5]	=$2,145
(f) Labor [3]	
10 Days x Technicians (4) x $400 / Day	= $16,000
3 Days x 2 Sampler Technicians x $400 / Day	= $2,400
"Landfill Capacity Assurance" Required at Closure:	**337 Yards**
Sub-Total Area Decontamination	**= $71,198**

[5] Clean Harbors Kimball, LLC, 2010.

20.1.4. Underground Pipeline Removal

(a) Backhoe [3]		
	$250 / Day x 2 Days	= $500
(b) Labor [3]		
	2 Days x Technicians (3) x $400 / Day	= $2,400
(c) Supervisor [3]		
	2 Days x Supervisor (1) x $450 / Day	= $900
"Landfill Capacity Assurance" Required at Closure:		**4 Yards**
Sub-Total Underground Pipeline Removal		**= $3,800**

20.1.5. Total for Tank Farm

The total closure cost estimate for the PCB Oil disposal, bulk tank disposal, crane, area decontamination and underground pipeline removal is $192,131.

20.2. Container Storage Areas

20.2.1. Container Inventory Removal

(a) Cost Calculation	
Treatable Oil: 500 lbs. / Drum x $0.331 / lb. [1]	= $166 / Drum
Askarel Oil: 743 lbs. / Drum x $0.331 / lb. [1]	= $246 / Drum
Capacitors: 250 lbs. / Drum x $1.16 / lb. [1]	= $290 / Drum
Transformers (Drained): 500 lbs. / Unit x $0.16 / lb. [4]	= $80 / Unit
(b) Disposal	
Treatable Oil: 0 Drum x $166 / Drum	= $0
Askarel Oil: 193 Drums x $246 / Drum	= $47,478
Capacitors: 65 Drum x $290 / Drum	= $18,850
Transformers (Drained): 193 Units x $80 / Unit [4]	= $15,440
Debris: 9 Drums x $75 / Drum [4]	= $675
(c) Transportation	
Transportation prices for incinerables are calculated to the Aragonite, Utah, facility (i.e. water, Askarel and capacitors). Transportation prices for landfillables are calculated to the Grassy Mountain Cell (i.e. transformers and debris).	
$600 per Day [2] / 2 Loads per Day	= $300 / Load
$300 Per 80 Drum Load	= $3.75 / Drum
Treatable Oil: 0 Drum x $3.75 / Drum	= $0
Askarel Oil: 193 Drums x $3.75 / Drum	= $724
Capacitors: 65 Drum x $3.75 / Drum	= $243
Transformers (Drained): 193 Units x $3.75 / Unit	= $723
Debris: 9 Drums x $3.75 / Drum	= $34
(d) Labor [3]	
It will take 2 technicians 7 days to drain, flush and load 193 transformers. It will take 2 technicians 2 days to remove and load the remaining container material from warehouse area.	
2 Days x Technicians (7) x $400 / Day	= $5,600
2 Days x Technicians (2) x $400 / Day	= $1,600
"Landfill Capacity Assurance" Required at Closure: (Transformers and Debris Only) (193 Transformers @ approx. 55 gal. ea. x 202 gal/yard^3 (9 drums @ 55-gallons)	**55 Yards**
Sub-Total Container Inventory Removal	**= $91,368**

20.2.2. Transformer Flush and Bulk Tank Disposal

(a) Oil Disposal	
193 Trans. x 8 lbs. / Gallon	= 6,755 Gallons
54,040 lbs. x 35 Gal. Flush / Trans. [4]	= 54,040 lbs.
6,755 Gallons x $0.12 / lb. [1]	= $6,485
(b) Oil Transportation To Aragonite	
$600 per Day [2] / 2 Loads per Day	= $300 / Load
$300 / Load / 40,000 lbs. / Load	= $0.008 / lb.
54,040 lbs. x $0.008 / lb	= $432
(c) Tank Disposal Charge	
3,000 Gallons x 1.5 lbs. / Gallon x 2 x $0.04 / lb.[4]	= $360
(d) Transportation to Grassy Mountain Cell	
$600 per Day / 2 Loads per Day	= $300 / Load
$300 / Load / 40,000 lbs. / Load	= $0.008/lb
9,000 lbs. x $0.008 / lb.	= $72
(e) Labor [3]	
Technicians (2) x 1 days x $450/day	= $800
"Landfill Capacity Assurance" Required at Closure: (9,000 lbs. x 0.000075 yards^3/lbs.)	**1 Yards**
Sub-Total Transformer Flush and Bulk Inventory Disposal	**= $8,149**

20.2.3. Area Decontamination and Concrete Removal

The concrete containment area has a surface area of 6,730 ft^2 and is 1 foot thick. The volume of concrete of the area is 6,730 ft^3.

(a) Concrete Breaker [3]	
$250 / Day x 10 Days	= $2,500
(b) Concrete Saw [3]	
$200 / Day x 5 Days	= $1,000
(b) Loader [3]	
$175 / Day x 10 Days	= $1,750
(d) Disposal at Grassy Mountain	
6,730 ft^3 / 27 ft^3 per Yd^3	= 249 Yd^3
249 Yd^3 x 3,000 lbs. / Yd^3	= 747,000 lbs.
747,000 lbs. x $0.04 / lb.[4]	= $29,880
(e) Transportation to Grassy Mountain Cell	
$600 per Day [2] / 2 Loads per Day	= $300 / Load
$300 / Load / 40,000 lbs. / Load	= $0.008 / lb.
$0.008 / lb. x 747,000 lbs.	= $5,976
(f) Labor [3]	
10 Days x Technicians (3) x $400 / Day	= $12,000
2 Days x Sampler Technicians (2) x $400 / Day	=$1,600
(g) Surface Wipe Sampling	
12 Wipe Samples x $100 per Sample [5]	=$1,200
(h) Sampling and Analysis of Soils Under/Around Warehouse	
Take 44 underlying soil samples after concrete removal to confirm clean.	
44 Samples x $100 per Sample [5]	=$4,400
"Landfill Capacity Assurance" Required at Closure: (747,000 lbs. Concrete x $Yards^3$/3,375 lbs.)	**222 Yards**
Sub-Total Area Decontamination	**= $60,306**

20.2.4. Total for Container Storage Area

The total closure cost estimate for the PCB Container Storage inventory removal, transformer flush and bulk tank disposal, area decontamination and concrete removal is $159,823.

20.3. Auxiliary Equipment

It is assumed that 4 rolloff boxes containing 30,000 pounds each of auxiliary equipment and debris will be accumulated and sent to a permitted chemical landfill.

(a) Disposal of Debris at Grassy Mountain	
120,000 lbs. x $0.04 / lb.[4]	= $4,800
(b) Transportation to Grassy Mountain Cell	
$600 per Day [2] / 2 Loads per Day	= $300 / Load
$300 / Load / 30,000 lbs. / Load	= $0.01/ lb.
$0.01 / lb. x 120,000 lbs.	= $1,200
(c) Labor [3]	
It will take 3 technicians 1 week to disassemble and load auxiliary equipment.	
5 Days x Technicians (3) x $400 / Day	= $6,000
"Landfill Capacity Assurance" Required at Closure: (120,000 lbs. x 0.000075 yards^3/lbs.)	**9 Yards**
Total Auxiliary Equipment	**= $12,000**

20.4. Administrative and Supervisor Costs

It is assumed it will take 9 weeks for a Project Manager to coordinate and supervise the closure of the facility.

(a) Labor [3]	
45 Days x Project Manager (1) x $650 / Day	= $29,250
Total Administrative and Supervisor Costs	**= $29,250**

20.5. Closure Certification

The 14 weeks of closure activity must be witnessed and verified by a certified Professional Engineer. It is assumed that this engineer is on site or billing 25% of the time during closure.

(a) Labor [3]	
70 Days x Engineer (1) x 0.25 x $120 / Hour	= $16,800
Total Closure Certification	**= $16,800**

20.6. Total Estimated Landfill Capacity Assurance (in cubic yards)

2.1.1 PCB Oil Disposal (off-site incineration)	0
2.1.2 Bulk Tank Disposal	7.5
2.1.3 Area Decontamination	337
2.1.4 Underground Pipeline Removal	4
2.2.1 Container Inventory Removal	55
2.2.2 Transformer Flush & Bulk Tank Disposal	1
2.2.3 Area Decontamination and Concrete Removal	222
2.3 Auxiliary Equipment	9
Sub-Total:	**636**
10% Contingency	64
Total Estimated Landfill Capacity Assurance:	**700 Yards ^{3}**

20.7. Total Estimated Closure Cost

20.1 Tank Farm	$192,131
20.2 Container Storage Areas	$159,523
20.3 Auxiliary Equipment	$12,000
20.4 Administrative and Supervisory	$29,250
20.5 Closure Certification	$16,800
Sub-Total:	**$410,004**
10% Contingency	$41,000
Total Estimated Closure Costs (2001 $'s):	**$451,004**

21.0 REVIEW AND ADJUSTMENT OF COST ESTIMATE

Adjustments to the cost estimate are required in two situations: (1) after certain modifications to the closure plan, and (2) annually to account for inflation. These situations are described below.

The owner/operator will revise the cost estimates within 30 days of Regional Administrator approval of any closure plan modification that increases the costs of closure. The following changes in facility conditions or activities could increase the closure cost estimate:

- An increase in facility size and/or capacity;
- An increase in the estimate of maximum inventory;
- Changes in regulatory requirements that affect the costs of closure activities;
- Contingencies over the operating life of the facility which affect the types of activities that will be required at closure (e.g., the occurrence of a spill necessitates additional closure activities); or
- Changes in surrounding land use (e.g., an increase in population density surrounding the facility warrants increased security provisions).

The owner/operator may also request that a reduction in the cost estimate be allowed if costs decrease. The following changes in facility conditions may justify a decrease in the closure cost estimate.

- Reductions in the size of the facility remaining to be closed over the remaining life of the facility;
- Changes in operating processes reduce the quantities of PCBs to be handled at the time of maximum estimated inventory;
- Reductions in costs of closure activities or disposal.
- Changes in regulations that allow for different disposal options than identified in the plan.

22.0 CLOSURE PLAN

22.1. Facility Description

22.1.1. General description

The Clean Harbors Grassy Mountain, LLC., PCB storage and transfer facility is located within the fenced perimeter of the Grassy Mountain facility and in close proximity to the PCB landfills that are also within the fenced perimeter of the Grassy Mountain facility. The storage and transfer area consists of a warehouse and a tank farm that are used to transfer and store Waste PCB liquids and PCB items.

22.1.2. Jurisdiction In Which Facility Is Located

The Grassy Mountain facility is located at the eastern edge of the Great Salt Lake Desert of Tooele County, Utah. It is approximately three miles east and seven miles north of the Knolls, Exit Number 41, off Interstate 80.

Latitude 40° 49’ 00" North
Longitude 113° 12’ 30” West

Township 1 North; Range 12 West; Section 16, plus a ½-mile perimeter buffer around the section.

The site address and contact telephone number is:

Clean Harbors Grassy Mountain, LLC.
Exit 41, Off I-80
3 Miles East, 7 Miles North of Knolls
Grassy Mountain, Utah 84029
801-323-8900

22.1.3. Written Description and Topographic

22.1.3.1. PCB Storage Facilities

The PCB Transfer and Storage facility consists of a PCB Warehouse and a PCB Tank Farm. The warehouse is one building with bermed storage area inside used for PCB item storage, PCB Transformer Drain and Flush operations, and storage of PCB liquids in two 3,000-gallon storage tanks. The unenclosed bermed tank farm consists of four additional tanks used to store PCB liquids, one tank to store clean diesel fuel / used oil and one for clean oil. The building is designated as PCB Warehouse One. Some of the items stored in PCB Warehouse One are PCB oil, Askarel (pure PCB), other PCB contaminated liquids, transformers, capacitors and debris. One of the tanks in the Tank Farm is designated to store PCB contaminated water and the other three are designated to store any type of bulk PCB liquids.

See Facility Map (Appendix 8) and USGS map in Closure Appendix A.

22.1.3.2. PCB Treatment and Disposal Facility

This section is not applicable.

22.1.3.3. Hazardous Waste Management Units

This section is not applicable.

22.1.3.4. All Buildings and Structures

See Section 22..1.3.1 above.

22.1.3.5. 100-Year Flood Plain

This facility is above any 100-year floodplain. The lowest point of elevation is 4,220 feet.

22.1.3.6. Adjacent Surface Waters or Wetlands

There is a man-made storm water run-off pond for the PCB landfills that EPA has identified as being surface waters. There are no surface waters within 1,400 feet of the PCB Transfer and Storage Facility. All storm water is contained on the Grassy Mountain facility property.

22.1.3.7. Surrounding Land Uses

The Grassy Mountain facility is located in the desert. The only other company in the proximity, is the Amax Magnesium Company. The Hill Air Force Range is approximately 7 miles north of the facility. Most of the land surrounding the facility is managed by the BLM.

22.1.3.8. Other Key Topographic Features

The Grassy Mountain facility is located in the Salt Lake Basin.

22.1.3.9. Traffic Patterns

Trucks may approach PCB Warehouse One from the East on the road that is bounded by PCB Landfill Cells X and Z on the North and Landfill Cell B/6 on the South or from the North on the same road bounded by Cells X and Y on the East and Grassy Mountain facility operations areas on the West. All road surfaces are clay and lime fines mixtures. Brine water from a well located in the adjacent Grassy Mountains is spread on the road surface for dust control. There are no special weight restrictions.

22.1.3.10. Location and Status of Underground Storage Tanks

There are no underground tanks for waste storage.

22.1.3.11. Location and Nature of Security Systems

22.1.3.11.1 24-Hour Surveillance System

A 6-foot high security fence with locked gates encloses the entire Grassy Mountain facility. All gates are kept shut and locked except when being used and/or monitored by security and/or operations personnel.

22.1.3.11.2 Barriers and Means to Control

See Section 22.1.3.11.1.

22.1.3.11.3 Safety Signs

Safety signs such as “No Smoking", “Fire Extinguisher", "Exit" and "Safety Shower"" are posted In accordance with OSHA in the active areas of the PCB storage facility.

22.1.3.12. Closed PCB Units

The PCB Oil Dechlorination Unit that was originally part of this facility was closed.

22.1.4. Description of Environmental Conditions On-Site

22.1.4.1. Proximity to Surface Waters Including Ponds, Lagoons, Wetlands and Storage Reservoirs

There are no surface waters in proximity to the Grassy Mountain facility. See topographic maps in Closure Appendix A. There is a man-made storm water run-off pond for the PCB landfills that EPA has identified as being surface waters. This pond is about 1,400 feet from the PCB Transfer and Storage Facility and there is a PCB landfill between the pond and the facility. There are no surface waters adjacent to the PCB Transfer and Storage Facility.

22.1.4.2. Proximity to Public or Private Drinking Water Sources

Bottled drinking water is brought to the site. Due to the high groundwater salinity, no groundwater in the vicinity can be used as drinking water.

22.1.4.3. Sewer Location and Design Which Could Result in Contamination of Sewers or Sewage Treatment Systems from PCB Spills

There are no surface sewer collection areas on the facility. PCB Warehouse One has an adjoining office with a bathroom, which is, served by a septic tank. The human waste is periodically pumped, solidified and placed in one of Grassy Mountain's RCRA permitted landfill cells.

22.1.4.4. Location of Nearby Grazing Lands, Farms and Vegetable Gardens

The nearest grazing areas are 20 miles from the facility.

22.1.4.5. Presence of a Shallow Well, Groundwater Near the Surface, or Which Poses a High Potential for Groundwater Contamination

22.1.4.5.1 There are no known injection or withdrawal wells either on-site or off-site within 1,000 feet of the facility.

22.1.4.5.2 There are no known intermittent streams within 1,000 feet of the facility.

22.1.4.5.3 There are no other known sources of groundwater that would be affected by possible PCB contamination.

22.1.5. Detailed Description with Engineering Drawings

22.1.5.1. Certification Statement as per 40 CFR 761.3

Under the civil and criminal penalties of law for the making or submission of false or fraudulent statements or representations (18 U.S.C. 1001 and 15 U.S.C. 2615), I certify that the information contained in or accompanying this document is true, accurate, and complete. As to the identified section(s) of this document for which I cannot personally verify truth and accuracy, I certify as the company official having supervisory responsibility for the persons who, acting under my direct instructions, made the verification that this information is true, accurate, and complete.

_____

Mr. Shane Whitney
General Manager
Clean Harbors Grassy Mountain, LLC.

22.1.5.2. Roof and Walls

The storage areas for containers and other PCB Items is in PCB Warehouse One. The building has a roof and walls that are in good repair and prevent rainwater from reaching stored PCBs and PCB items. PCBs may also be stored in bulk tanks in the Tank Farm, which is not enclosed by a roof and walls. Instead, these tanks meet the requirements at 40 CFR 761.65(c)(7)(i) and (ii), as applicable.

22.1.5.3. Flooring

PCB Warehouse One has a concrete floor. There are no expansion joints in the floor. The floor is inspected weekly for cracks or damage to sealed joints and repaired accordingly.

22.1.5.4. Curbing and Containment Volume

22.1.5.4.1 Curbing and Material of Construction Information

At the time the floor was constructed, reinforcement bar was placed to provide support for the curbing that was poured a few days later. The new concrete floor was freshly cured and required no surface preparation. Additional reinforcement bar was wired to the vertical studs of bar imbedded in the floor. This additional bar consisted of two strands, one above the other running parallel and horizontally around the area that was to form the berm. Wooden forms were constructed around the reinforcement bar and the curbing was poured using medium strength concrete.

22.1.5.4.2 Containment Volume

Table A describes the containment capacity summaries for the storage areas in PCB Warehouse One along with the capacity calculations. These calculations assume that curbing exists between all storage areas in PCB Warehouse One. According to 40 CFR 761.65(b)(1)(ii), "… the floor and curbing must provide a containment volume equal to at least two times the internal volume of the largest PCB Article or PCB Container or 25 percent

of the total internal volume of all PCB Articles or PCB containers stored, whichever is greater".

According to the reference, Area A, which has a containment capacity of 12,926 gallons, could store 51,704 gallons or 940 55-gallon drum equivalents. Area B, which has a containment capacity of 12,986 gallons, could store 51,944 gallons or 940 55-gallon drum equivalents. The maximum total capacity of 350 55-gallon drum equivalents, to be stored in the combined Area A and Area B, is well within the maximum allowed by the regulatory reference for either area even if the two 3,012-gallon tanks (the equivalent of about 110 55-gallon drums) are included.

Table H: PCB Warehouse One Containment Capacities

	Area A	Area B
Length (Feet)	40	40
Width (Feet)	44	44
Height (Feet)	1	1
Gross Volume (Ft^3)	1,760	1,760
Sump Volume (Ft^3)	32	8
Ramp Volume (Ft^3)	64	32
Net Volume (Ft^3)	1,728	1,736
Net Volume (Gallons)	12,926	12,986
Net Volume (55-Gallon Drum Equivalents)	235	236
Maximum Number of 55-Gallon Drum Equivalents	350 55-Gallon Equivalents plus 2 tanks of 3,012 Gallon capacity each for a total of 471 55-Gallon Equivalents.	
Typical Container Size (Gallons)	55	55

Within PCB Warehouse One, Area B, are two tanks that may be used to store PCB Liquids. Each tank is constructed of all steel. The tanks are described in Table B.

Table I: Bulk Tank Descriptions, PCB Warehouse One, Area B

Tank ID	Tank 3A	Tank 3B
Length (Feet)	14.25	14.25
Diameter (Feet)	6.00	6.00
Capacity (Gallons)	3,012	3,012

22.1.5.5. Drain Valves, Floor Drains, Expansion Joints, etc.

The existing floor has no expansion joints, and no floor drains or other openings of any type.

22.1.5.6. Storage Pallets Outside of Storage Buildings (Including Locations and Numbers)

No pallets of large high voltage capacitors or PCB-Contaminated Electrical Equipment that has not been drained of free flowing dielectric fluid will be stored outside of the PCB storage areas in the building.

22.1.5.7. Tank Farm

22.1.5.7.1 Description of Tanks

Drawings of the tank locations are provided in Appendix B. Table J summarizes some of the relevant aspects of each tank that may be used for PCB storage. Note that Tank 7 is used for RCRA used oil storage only.

Table J: Bulk Tank Descriptions - Tank Farm

Tank ID	1	2	4	5	6	7
Height (Ft)	25	25	15	15	15	25
Diameter (Ft)	12	12	11	11	11	12
Capacity (Gallons)	21,138	21,138	10,657	10,657	10,657	21,138
Year Made	1985	1985	1985	1985	1985	1985
Contents	Askarel or Other PCB or PCB Contaminated Fluids	Askarel or Other PCB or PCB Contaminated Fluids	Askarel or Other PCB or PCB Contaminated Fluids	PCB Contaminated Water	Clean Oil	Used Oil (RCRA)

In addition there is one four-inch waste underground pipeline that connects the Tank Farm to PCB Warehouse One. It is a steel pipe with welded connections. The underground portion is in a plastic sleeve so that inspections for leaks can be made and it is about 200 yards long. When full it would contain approximately 392 gallons.

Thus the total of the Tank Farm tank capacities for TSCA Regulated PCB Fluids and RCRA-regulated used oil is 84,728 gallons. Each tank described in Table C is of all steel construction, and is used to contain the liquids identified in the table. The tanks were designed and constructed according to the American Petroleum Institute standard 650 (API 650), Welded Steel Tanks for Oil Storage, Edition 7. The API 650 standard encompasses all the parameters necessary for the design and construction of the tanks, including:

- Materials of construction;
- Design of bottoms, roofs, shells, joints, connections, and appurtenances;
- Anchoring;
- Fabrication and construction;

- Testing, repairs, and inspection;
- Welding; and
- Marking.

All tank seams were welded in accordance with the applicable standards to which each tank was built. Refer to the appropriate standard for more detailed information. Tanks 1, 2, 5, and 6 have the following spill prevention controls while Tank 4 and Tank 7 are not regulated by TSCA but have the same spill prevention controls.

- Float Type Level Gauges
  Before pumping into the tanks, the level is checked to determine the amount of material that may be pumped without possibility of spill. Use of these gauge readings is the normal procedure for determining the free board space.
- Internal Emergency Valve with Fusible Link
  Each of the above tanks has internal emergency valves with fusible links on the bottom valve openings. These valves are designed to automatically close if the temperature at that valve is above a predetermined set point. This safety factor is designed to seal the tank in case of fire.
- Emergency Vent
  This vent is designed to remain closed until a predetermined internal tank pressure is exceeded. The vent is meant to open if the tank requires additional venting capabilities, and provide additional protection against tank rupture.
- Normal breathing vent
  This vent provides for the normal venting of the tank during operation. This vent is normally closed, but opens at predetermined set points for pressure or vacuum.
- Manual Valving
  Each tank, in addition to the internal emergency valve, has a manual ball valve that can be visually checked to determine open or closed status.
- Physical Binding of Quick Connect Couplings
  This procedure insures that all quick connect couplings are wired or otherwise physically bound together to prevent accidental line decoupling during PCB transfer.
- Contingency Plan
  The tank farm area containing the tanks described in this section has a written protocol (Section 22.1.5.7.2), for the prevention and handling of spills or other emergencies.
- Spill Kit
  The tank farm area described in this section has a spill kit that contains supplies for spill containment and clean up.

22.1.5.7.2 Tank Management Practices

The following practices are employed as a means of spill prevention:

Typical inlets and tank outlets and quick connect couplings are preceded by a ball valve that enables operators to shut off the flow of liquids before

connecting or disconnecting any hoses or other parts of the tank system for repairs, maintenance or regular operations. Most lines in the system are designed to allow them to be pumped dry by the pumps in operation before being opened or closed. When appropriate, connections and breaks in lines are done with an appropriately sized spill pan or absorbent pad underneath the connection so as to reduce the possibility of spills or spatters. Heavy-duty flexible oil transfer hoses, or their equivalent, are used.

Coupling connections are typically tied off with wire or an equivalent fastener to reduce the possibility of their coming undone during a transfer operation.

In order to minimize the potential for leaks from tanks during loading or unloading, the inlet and outlet lines of the large tanks are equipped with a locking ball valve that is locked in the closed position with a padlock when the facility is not in operation.

To minimize *de minimus* releases from lines, couplings are typically covered with fitted covers (if male) or plugged (if female) when not in use. The operator prior to initiating transfer operations checks all lines for obvious leaks and correct valve position.

The following equipment and procedures are typical of those used to prevent the overfilling of the bulk storage tanks during transfer operations.

All tanks are equipped with level sensing devices that enable operators to determine the level of the liquid in the tank to the nearest half-inch. All tank levels are recorded in the daily tank farm log at the beginning and end of the working day. When a transfer has occurred from one tank to the other the affected tanks are rechecked to verify liquid levels. Operations personnel to ensure that no mistakes have occurred and that, within reason, all material is accounted for check these figures.

Prior to a transfer operation taking place, the operations personnel check the level-sensing device on both tanks to make sure that it is the same as recorded on the operations log. The amount to be transferred is then calculated from a conversion chart that converts the level in the tank to gallons of material and vice-versa. The final levels for both tanks are calculated, the transfer lines are checked for valve position and leaks, and the transfer process is begun. At all times during the PCB transfer process there is an employee in the area of operations. An operations employee checks the level sensing devices at appropriate intervals to ensure that the predetermined amount is transferred, and that overfill does not occur. At the end of the transfer process, an operations employee records the transfer in the Daily Tank Farm Log, recalculates the final levels in the tank, and checks the level-sensing device to ensure that all calculations were correct. The new levels of the tanks are then recorded in the log.

22.1.5.7.3 Secondary Containment Requirements

22.1.5.7.3.1 Materials Managed in the Tanks

Section 22.1.5.7.1 describes materials that are managed in the tank farm. No incompatibilities exist between the materials described and the steel tank construction.

22.1.5.7.3.2 Containment System Design

The tank farm containment is constructed of concrete reinforced with rebar and the expansion joints are equipped with water stops. The joints were sealed with epoxy and the entire containment surface coated with an epoxy grout to form an impervious surface free of cracks and gaps. Any precipitation in the form of run-on is removed from the containment sumps for disposal at an EPA approved facility.

The following is a list of the materials used in the construction of the secondary containment system and their specifications:

Concrete

The concrete used was normal weight concrete with a compressive strength of 3,500 psi at 28 days curing time. Air entrained concrete shall be used for all concrete exposed to weather.

Reinforcing Steel

All reinforcing steel conformed to ASTM Standard Specification A185 and A82.

The secondary containment system was built in three separate parts: the tank foundations, the berm wall, and the floor. The secondary containment system is designed and maintained to be free of cracks or gaps. The containment area is inspected at least weekly according to the inspection schedule. When a crack in the floor, berm walls or internal ramps is noted, it is repaired as is appropriate. Typically, the repairs are accomplished by sealing the cracks. To seal the cracks, they are first thoroughly cleaned and any loose chips are removed. Then an appropriate sealant is applied. If a gap is noted in the floor, berm walls or internal ramps, it is repaired as appropriate. Roughening the surfaces of the gap and applying an epoxy-bonding agent to the surfaces typically accomplish this. This agent seals the surface and improves the adhesion of the filler material (concrete) that is then poured and set inside the gap if necessary. After the filler material has set, the edges of the repaired area are sealed again on all exposed surfaces using an appropriate sealant. The appropriate methods for repairing cracks or gaps may be employed (e.g., replacing the affected area) as long as the crack or gap is repaired in a timely manner. Further, interim measures may be employed to

minimize the potential for escape of spilled material should the repair take an extended period of time (e.g. days) to accomplish.

Sealants appropriate for sealing of containment areas and crack repair shall be utilized.

22.1.5.7.3.3 Containment System Capacity

The containment system in the Tank Farm consists of three separate bermed areas. The capacity of the berms and the containment capacity calculations are described in Table D.

Table K: Tank Farm Containment Capacities

	Area I	Area II[6]	Area III[6]
Length (Feet)	48.75	20.00	27.00
Width (Feet)	64.417	64.417	60.417
Height (Feet)	1.167	1.333	3.333
Gross Volume (Ft^3)	3,664	1,713	5,436
Sump Volume (Ft^3)	42.67	16.00	42.67
Ramp Volume (Ft^3)	131.3	53.2	0
Tank Pad Volume (Ft^3)	601.5	0	715.8
Net Volume (Gallons)	2,927	1,676	3,971
Net Volume (Gallons)	21,895	12,539	29,708

Each of the Tank Farm storage areas has the minimum capacity necessary to meet the containment requirements of 40 CFR Part 112 as specified in 40 CFR 761.65 (c)(7) and Utah Admin Code R315-15-5. The 40 CFR Part 112 specifies the containment capacity be 100% of the contents of the largest container including freeboard.

22.1.5.7.3.4 Control of Run-off

As described in Sections 22.1.5.7.3.2 and 22.1.5.7.3.5, the secondary containment system was designed and built to prevent the migration of liquids to the environment. Any precipitation, leaks or spills that enter the Tank Farm secondary containment system will be collected at a sump. Once collected, the materials are disposed of according to Section 22.1.5.7.3.5.

22.1.5.7.3.5 Removal of Spills or Leaks from the Containment System

[6] Area II and Area III are hydraulically connected. Thus the total containment capacity for the tanks in Area III is the combination of both Area II and Area III or 42,247 gallons.

The daily inspection of this area will reveal any collected liquids in the sump or any spilled or leaked material on the floor. Collected liquids in the sump will be pumped into an appropriate container. The material will be considered to be PCBs, unless the liquid is tested and found to be below the applicable Federal, State and local levels. It will be stored, treated, and disposed of in accordance with all applicable regulations.

The removal of spilled or leaked material from the containment system that has not migrated into the sump will be accomplished using appropriate clean-up procedures. All recovered material from the cleanup, and all liquid material that enters the containment system will be stored, treated, and disposed of as PCB material, if appropriate.

22.1.5.7.4 PCB Materials Volatility

The PCB materials typically handled with contaminated mineral oils, have a vapor pressure well below 78 mm Hg @ 25°C. The mineral oil itself has a vapor pressure that varies depending on the source but is approximately 0.01 mm Hg @ 20°C. The vapor pressure of PCBs varies depending on the amounts of the various Aroclors in the mixture. The vapor pressures of Aroclors vary from non-detectable to 0.001 mm Hg @ 100°F. As both of these materials are substantially below the limit of 78 mm Hg @ 25°C, the PCB contaminated Mineral Oils can be exposed to atmospheric conditions without migrating to the environment.

22.2. Disposal of PCB Waste Inventory

22.2.1. Maximum Inventory

22.2.1.1. Provide Design Capacity

Table A provides the maximum capacities for the two storage areas in PCB Warehouse One. The total combined capacity of the two areas is 25,912 gallons or 471 55-gallon drum equivalents. Section 22.1.5.7.1 states the total of the Tank Farm PCB storage tank capacities is 64,142 gallons.

22.2.1.2. Estimate of Maximum Types and Quantities

Based on historical levels, the approximate percentages of each waste type that may be stored in PCB Warehouse One are described in Table E. The percentages are reflected in the waste capacities shown in the Table F.

Table L: Estimate of PCB Waste Type Percentages

Waste Type	Percentage
Askarel	42

Transformers (Drained)	42
Capacitors	14
Debris	2

Table M: PCB Warehouse On Waste Capacities

Waste Type	55-Gallon Drum Equivalents
PCB Transformers (Drained and assuming worst case that all transformers are > 50 mg/kg (ppm).	193
Capacitors	65
Debris	9
PCB Liquids (Includes 6,000 gallons of PCB Liquids in bulk storage tanks.	193
Total PCB Inventory	460

22.2.2. Disposal of Inventory

22.2.2.1. Details to Ensure Compliance as a PCB Waste Generator

Grassy Mountain Facility will adhere to PCB waste generator requirements when managing PCB wastes created during the closure process. Some of these requirements are listed below:

Containers

Containers used to store PCB liquids or solids created during closure will meet the container specification requirements of 40 CFR 761.65(c)(6) and (7).

Marking and Labeling

Containers will be marked with formats specified at 40 CFR 761.45, and date of storage for disposal shall be written on the container when it is placed in storage in accordance with 40 CFR 7 61.65(c)(8).

Manifesting

When shipped to a commercial storage or disposal facility, PCB wastes will be listed on a shipping manifest (such as EPA Form 8700-22 or a similar State manifest) that specifies the shipper/generator, the transporter, and the destination facility. In accordance with paragraph 761.207(a), PCB wastes will be listed on the manifest with additional unique descriptive information, as appropriate. Shipment dates will be compared with receipt dates, and storage for disposal dates with dates on Certificates of Disposal to help ensure timely disposal of PCB wastes created during closure. Exception reports will be sent to EPA in accordance with 40 CFR 761.215.

Recordkeeping

Records will be maintained to show the PCB wastes created during closure and their disposition. This information will be recorded in the facility's annual document log and included in the annual report in accordance with 761.180(b). These records will be maintained at the owner/operator offices or will be sent as originals or copies to EPA.

22.2.2.2. Estimate of Maximum Inventory to be Sent for Disposal

Refer to Section 22.1.5.7.1 and 22.2.1.2 for the Tank Farm and PCB Warehouse One maximum capacities of wastes in storage.

22.2.2.3. Description of Any Treatment Prior to Transport, If Applicable

Tanks used to store oil with greater than 50 mg/kg (ppm) PCBs will be landfilled or after decontamination, scrapped or stored for reuse or reused. The closure cost estimate includes the cost of land filling in a PCB landfill at Grassy Mountain using market prices for disposal.

22.2.2.4. Methods and Arrangements Used for PCB Waste Removal and Transportation to Approved Storage and Disposal Facilities

22.2.2.4.1 PCB Storage Tank Waste Removal

In the event of closure, each PCB storage tank in the commercial storage facility will be emptied as will the oil from the pipeline to the warehouse. Oil will be transferred into a bulk oil tanker or drums for shipment to a PCB disposal facility.

22.2.2.4.2 PCB Container Removal

Forklifts or other mechanical devices will be used to remove the waste containers. All PCB wastes will be sent to EPA approved facilities with appropriate disposal technology and capability. Liquids will either be transferred from drums into a tank truck or shipped in their original containers. Approximate loading time per tanker, flatbed, or van trailer is 2 hours. A tanker will hold approximately 54 drums or about 40,000 pounds of Askarel. Solids such as capacitors, debris drums and transformers will be loaded onto flatbed trucks and transported to an appropriate facility. Approximate loading time is 2 hours to load 80 drums per truck. Drums are assumed to weigh approximately 500 pounds. A 1,000-pound transformer would be considered as two (2) 55-gallon drums. It takes about 35 gallons of diesel fuel to flush a 55-gallon equivalent PCB transformer.

22.2.2.5. Description of Treatment/Disposal Methods at the Final Treatment/Disposal Facilities

These are presented only to represent what was assumed to calculate the Closure Cost Estimates. Any approved treatment and/or disposal facility may be used during actual closure even if not identified in this closure plan.

22.2.2.5.1 Disposal of Treatable Mineral Oils

22.2.2.5.2 Storage Container Disposal

For closure cost estimate purposes disposition of each category is as follows:

- Askarel / Untreatable Oil — Incineration
- Transformer Flush — Incineration
- Water — Incineration
- Transformers (Drained/Flushed) — Landfill
- Capacitors — Incineration
- Debris — Landfill

For closure cost estimate purposes it is assumed that items to be incinerated will be sent to the Aragonite, Utah, facility, and that landfill items will be sent to the Grassy Mountain facility PCB landfill cell.

Disposal facilities assumed for closure cost estimate purposes for these categories are shown below in Table F. Any approved facility may actually be used during closure.

Table N: Disposal Facilities for PCB Materials

Facility Location	Material	Disposal Method
Clean Harbors Aragonite, LLC. Aragonite, Utah.	Incinerables. Including liquids and sludges below 500 mg/kg (ppm).	Incineration
Clean Harbors Grassy Mountain, LLC. Knolls, Utah.	Solids.	Landfill

22.2.2.6. Bulk Tank Removal, Transport, Tracking, and Disposal of Tank Capacity

Contaminated tanks will be removed using rigging and a crane. Tanks to be landfilled (rather than scrapped or reused) will be loaded onto transport vehicles and transported to the Grassy Mountain facility's PCB landfill cell.

22.2.2.7. Proposed Schedule to Complete Disposal within 90 Days from Closure Commencement

The Regional Administrator shall be notified at least 90 days prior to the intended beginning of closure activities. However, closure activities may begin before the end of that 90-day period. The schedule below indicates the activities and actions to take place after closure is initiated. The day closure activities are initiated is assumed to be day one. The anticipated closure schedule is shown in Section 22.5.

22.3. Closure Plan Sampling, Decontamination

22.3.1. Equipment and Area Classification

22.3.1.1. Tank Farm

The Tank Farm will be closed to 40 CFR 761.61 high occupancy area and 40 CFR 761.79 non-restricted access standards. Pursuant to previous correspondence with EPA Region 8, the concrete containment will be removed. It will be disposed as Bulk PCB Remediation Waste. Any spills occurring outside of the containment areas during closure will be cleaned to the PCB Spill Cleanup Policy Standards, 40 CFR 761 Subpart G. Any spills occurring inside the containment areas will be cleaned and double wash/rinsed, but no confirmatory sampling will be done as the containment will be disposed in a PCB landfill.

22.3.1.2. PCB Warehouse One - Container Storage Area

Warehouse one will be closed to 40 CFR 761.61 high occupancy area and 40 CFR 761.79 non-restricted access standards. For closure cost purposes, it is assumed that the uncoated concrete containment areas will be removed and disposed as Bulk PCB Remediation Waste. Any spills occurring outside of the containment areas during closure will be cleaned to the PCB Spill Cleanup Policy Standards, 40 CFR 761 Subpart G. Any spills occurring inside the containment areas will be cleaned and double wash/rinsed, but no confirmatory sampling will be done as the containment will be disposed in a PCB landfill.

22.3.2. Numerical Standards

Because, after closure, the structures and/or land will be converted to another use, the site shall be cleaned up to the non-restricted, high occupancy area requirements. Target levels for this classification are described below:

- High contact indoor or outdoor solid surfaces should be cleaned to 10-micrograms/100 cm^2 (as measured by standard wipe test).
- Low contact, outdoor, impervious solid surfaces should be cleaned to 10-micrograms/100 cm^2 (standard wipe test).
- Low contact, outdoor, non-impervious solid surfaces should be cleaned to 10-micrograms/100 cm^2.
- For spill cleanups, PCB contaminated soil should be removed to 10 ppm, provided that soil is excavated to a minimum depth of 10 inches. The excavated soil should be replaced with clean soil (< 1 mg/kg dry weight basis (ppm) PCBs).
- As Bulk PCB Remediation Waste, PCB contaminated soil and other non-impervious surfaces should be removed to 1 mg/kg dry weight basis (ppm).

22.3.3. Statistical Sampling Program

22.3.3.1. Safety Plan

The safety plan details precautions required to minimize the risk to personnel performing the on-site inspection and sampling in addition to the facility's or contractor's standard safety plan. It should be noted that this facility receives no RCRA hazardous wastes.

22.3.3.1.1 Personal Protective Equipment (PPE)

A minimum of a hard hat, safety glasses and steel-toed boots will be worn while work is being done in either the Tank Farm or PCB Warehouse One or while inspections are being performed. Appropriate additional PPE (such as Tyvek suits, face shields, leather gloves, chemical resistant gloves, chemical resistant boots, etc.) will be worn while sampling, working with liquids, transferring wastes, etc. If dust will be generated by an activity, either a half-face respirator with high efficiency filter and goggles will be worn or a full-face respirator with high efficiency filter will be worn.

22.3.3.1.2 Confined Space Entry

No confined space entries will be performed except by those trained in accordance with OSHA Standards.

22.3.3.1.3 Work Permits

Hot work permits will be issued prior any use of open flames or metal cutting.

22.3.3.2. Initial Inspection of the Facility

The facility owner/operator or (contractor) will perform the initial (visual) inspection of the facility. Visually contaminated areas, along with areas suspected of contamination due to operator knowledge will be assumed as contaminated with PCBs and will either require sampling to determine if the area is contaminated with PCBs or disposal as PCB waste. The inspection will cover the entire transfer and storage area, including tanks, valves, equipment, containment areas, and 100 feet from the perimeter of the facility containment areas. Because the owner/operator will perform the initial visual inspection of the facility, valuable historical insight can be considered when investigating areas that may need remediation. This methodology will include historical use of buildings, types of exposure to PCB (i.e. liquids or solids contact, high-level or low-level PCBs), protection of surfaces such as epoxy floor coatings, traffic through buildings and throughout the plant, and containment and/or migration protection.

All PCB storage takes place within bermed concrete containment areas. The concrete surfaces may have come in contact with PCBs over the history of the use of the buildings and tank farm. All containment areas will be tested for contamination using grid sampling or, alternatively, random sampling where random sampling is deemed desirable or removed and disposed as PCB Bulk Remediation Waste without sampling. The closure cost estimate assumes the latter.

Prior to removing the containment, the underground PCB waste pipe will be removed, any residual liquid drained into a waste container and the structures over the containment will be washed to remove any buildup of dust. Any visually stained areas remaining after this washing will be sampled to determine if they are PCB or not. Soil samples will be taken from around

PCB Warehouse One and the Tank Farm and from the soil under the containment after the containment is removed wherever staining or operator knowledge would indicate potential PCB contamination. While it is not expected that areas around or under the containment will be contaminated because PCB spills have always been cleaned in accordance with the PCB Spill Cleanup Policy throughout the life of the facility, it is assumed for Closure Cost Estimate purposes that soil samples will be taken.

Random wipes will be used for solid surfaces on equipment where contamination is either likely or suspected or the equipment will be decontaminated per 40 CFR 761.79 or the equipment will be disposed. For cost estimate purposes, it is assumed that the equipment is disposed. Liquid transfer and storage equipment such as pipes, hose and tanks will be assumed to be contaminated. Equipment will be assessed as to the practicality of decontamination versus disposal in a chemical waste landfill. For closure cost estimate purposes, disposal is assumed.

Records of PCB concentration and/or type of PCB waste are recorded with each unit's unique identification number in the case of drums, transformers, capacitors, and associated materials. These records shall be compared against the actual physical inventory of PCB material in the container storage and Tank Farm areas. In the event of obvious discrepancies, the material shall be sampled to determine the proper method of disposal.

22.3.3.3. Sampling Plan

The facility PCB commercial storage activities are limited to the PCB Warehouse One and the Tank Farm. The warehouse is used for the handling and storage of PCB items including but not limited to PCB and PCB contaminated transformers, PCB debris, PCB capacitors, and PCB and PCB contaminated liquids. The levels of PCBs handled range from 0 to 1,000,000 ppm PCB. All PCB storage takes place within a concrete containment berm. The Tank Farm is the location where the majority of the PCB liquids are stored in bulk. This area is located within a bermed concrete containment area. The Tank Farm has no roof. Several bulk tanks are located within this area.

After the concrete containment of each of these areas has been removed, the soils that were under the containment as well as its surrounding soils, will be sampled in accordance with 40 CFR 761 Subpart O procedures to identify any presence of PCB contamination above restricted standards. Appropriate sampling methods for the items and surfaces to be tested will be determined in accordance with 40 CFR 761.79 and/or 761.61, i.e. Subpart P sampling for impervious surfaces and Subpart O sampling for non-impervious surfaces.

22.3.3.3.1 PCB Warehouse One Sampling Plan

The PCB Warehouse One container storage area is composed of five berms (A through E). However, only the A & B berms are used to manage PCBs. During the operational life of the facility, PCB Transformers, crushed PCB drums, PCB capacitors, PCB Article Containers, and PCB Containers will be stored in berms A and B. The berms have concrete floors and sidewalls. The closure cost estimate assumes that no sampling of these Areas will be done. Containment

berms A and B will be removed and disposed as PCB wastes in the adjacent Grassy Mountain PCB landfill cell.

There is no reason to suspect that the walls or roof (inside or out) would be contaminated with PCBs. Nor is there any reason to suspect that the soil under the containment or the soils surrounding the warehouse are contaminated with PCBs as all PCB spills throughout the life of the facility will be cleaned to the PCB Spill Cleanup Standards. However, the walls and roof will be inspected for staining and any stained areas or areas suspected of being PCB contaminated based on operator knowledge will be sampled to determine if PCB contamination exists. As stated previously, the soil under the removed concrete will be sampled in accordance with 40 CFR 761 Subpart O. For closure cost estimate purposes it is assumed that 285 such samples will be taken, 275 soils and 10 wipes from impervious surfaces. A total of 56 analyses are included in the closure cost estimate to account for compositing the soil samples into 36 samples to analyze and 10% method blanks and 10% trip blanks.

The analytical method used to determine PCB concentration in samples will be the current SW-846 method for analyzing PCBs.

22.3.3.3.2 Tank Farm Sampling Plan

The Tank Farm is composed of three separate areas (Area I, Area II and Area III). Each berm has sump chambers and ramps. Area I has three tank pads for tanks 4, 5 and 6. Area III has three tank pads for tanks 1, 2 and 7 and is joined to Area II via a weir. During the operational life of the treatment facility that has already been closed, PCB Oils and water were stored and treated/decontaminated, clean fuel oil and used oil was stored in the Tank Farm. Subsequent to closure of the treatment unit, these same materials, except for treated oils, are stored in the tank farm. The tank used to store treated oils no longer stores any materials but could be used to store clean, non-volatile liquids in the future.

The Tank Farm areas have concrete floors and sidewalls, which are coated with an epoxy grout that extends up the berm wall and over the sealed expansion joints. However, this coating was applied to cap a spill that could not be cleaned to spill cleanup standards. Thus, the tank farm containment area will not be sampled, but will be removed and disposed as PCB waste in the adjacent Grassy Mountain Facility PCB landfill cell.

There is no reason to suspect that the soil under the containment is contaminated with PCBs as all PCB spills throughout the life of the facility (except as noted above) are cleaned to the PCB Spill Cleanup Standards. However, the area under the containment will be sampled according to 40 CFR 761 Subpart O to determine if PCB contamination exists. For closure cost estimate purposes it is assumed that 375 soil

samples will be taken and composited into 45 samples to analyze. A total of 55 analyses are included in the closure cost estimate to account for 10% method blanks and 10% trip blanks.

The analytical method used to determine PCB concentration in the samples will be the current SW-846 method for analyzing PCBs.

22.3.3.3.3 Quality Assurance and Quality Control

22.3.3.3.4 Sampling Procedures

A comprehensive program is essential in order to ensure that all samples taken are appropriate for the analysis being performed, that the analysis is complete and accurate, and that the final reports contain sufficient information to achieve their intended purpose.

PCB wipe and solid samples will include 10% trip blanks and field blanks.

22.3.3.3.5 Sample Collection

PCB Wipe and solid samples will be taken in accordance with the appropriate sections of 40 CFR § 761.

22.3.3.3.6 Traceability

Traceability is achieved when the documentation surrounding a sample and its analysis is such that a set of data can be traced back through the analyst, to the person performing the sampling, and then to the material sampled itself. All samples receive a unique sample identification number to facilitate this process.

Chain-of-Custody procedures will be used when shipping samples off-site. In order to trace sample possession from the time of collection, a traceability record is filled out and accompanies the sample. The record contains the following information:

- sample ID;
- signature of the collector;
- date/time collected;
- waste type;
- signature of persons involved;
- inclusive date of possession; and
- cross-reference to manifest (if applicable).

22.3.3.3.7 Sample Labels

Sample labels are necessary to prevent misidentification of samples. The labels are gummed and affixed to the containers prior to or at the time of sampling. The labels are filled out at the time of collection.

22.3.3.3.8 Sample Seals

Sample seals are used to detect any tampering during shipment for samples sent off-site. The seals are initialed, dated, and then affixed to the sample containers or shipping containers before the samples leave the custody of the lab. Sample seals are not necessary for samples taken onsite at the facility and sent to the onsite laboratory or if being transported by facility or project personnel or the personnel from the laboratory that is going to perform the analysis.

22.3.3.3.9 Sampling Record

All information pertinent to field surveys or sampling is recorded in a record. Since sampling situations vary widely, no set of rules can be given as to the extent of information that must be entered in the record. However, sufficient information is recorded to allow someone to reconstruct the sampling without reliance on the collector's memory. This record includes at minimum the-following information:

- location of sampling point;
- volume of samples taken;
- date of collection;
- sample identification number;
- person sampling;
- comments or observations;
- sampling methodology

22.3.3.3.10 Chain-of-Custody

Sample chain-of-custody is maintained as required by the client or regulatory agency. A chain-of-custody is used to ensure the data from sample collection to data reporting is legally defensible. This includes the ability to trace the possession and handling of samples from the time of collection through analysis and final disposition.

The components of the chain-of-custody include the following: sample seals, a log and chain-of-custody record. The procedures for their use are described in further detail.

A sample is considered to be under a person's custody if:

- it is in a person's physical possession;
- in view of the person after possession has taken place;
- secured by that person so that undetected tampering with the sample cannot occur; or
- secured by that person in an area, which is restricted to authorized personnel.

Upon receipt of the sample(s) in the laboratory they are entered into the sample receipt log. All chain-of-custody samples are directed to the sample custodian. The shipping containers and sample bottles are inspected for proper seals and labels. The contents of the containers are then checked against the chain-of-custody record. The chain-of-custody record may include but is not limited to the following:

- Sampler Signature
- Date/Time Sampled
- Sample ID
- Type of sample (i.e. composite or grab)
- Number of Containers
- A place for comments
- Blocks for the person relinquishing the sample to sign, print his/her name, and put the date and time the sample was relinquished.
- Blocks for the person receiving the sample to sign, print his/her name, and put the date and time the sample was received.

If the chain-of-custody information is complete and the integrity of the samples has not been broken, each sample is assigned a unique identification number. If the information on the chain-of-custody record is not complete, the sample custodian shall contact the appropriate facility personnel to obtain the missing information, and a unique identification number is assigned. All problem resolutions will be documented in the sample receipt log. The samples are then put into storage to await analysis.

22.3.4. Tank Farm Decontamination Procedure

22.3.4.1. PCB Storage Tank Inventory Removal

See Section 22.2.2.4.1 for PCB Storage Tank Waste Removal.

22.3.4.2. Tank Decontamination/Removal/Disposal

Tanks that contained oil with greater than 50 ppm PCB will be designated for disposal at the on-site PCB permitted chemical landfill cell. Alternatively, such tanks may be decontaminated in accordance with 40 CFR 761.79 prior to scrapping or reuse. The closure cost estimate assumes disposal.

22.3.4.3. Tank Farm Containment Area

The tank farm containment will be removed and disposed in a chemical waste landfill approved by TSCA regulations for bulk PCB remediation waste disposal. The closure cost estimate provides for disposal in one of the adjacent Grassy Mountain Facility PCB landfills.

The amount of material to be removed from the Tank Farm storage areas including the ramps, sumps and tank pads are 1.5 feet times the total area of the internal containment area surfaces.

This results in 337 cubic yards of material with an estimated weight (based on 3,000 pounds per cubic yard) of 505.5 tons. This assumes 2 feet of concrete for each pad and ramp and one foot of concrete for the remaining tank farm containment area. It also assumes the berms are three feet deep, 6 inches wide at the perimeter of the combined areas plus the two dividing berms yielding 25 yards of concrete and 17 yards for the 1-foot thick unload pad.

22.3.5. PCB Warehouse One Storage Areas

22.3.5.1. Container Removal

See Section 22.2.2.

22.3.5.2. Container Storage Area Decontamination/Disposal

After all containers of waste have been removed from bermed areas and sent out for disposal, the walls and roof areas will be inspected for staining and sampled to determine if they need to be decontaminated. The containment area floor will be removed and disposed as Bulk PCB Remediation waste. The closure cost estimate provides for disposal in one of the adjacent Grassy Mountain Facility PCB landfills cells.

For closure cost calculations, the volume of concrete removed was determined by multiplying the area of the internal surfaces of the warehouse PCB containment areas (including the truck drive through areas) by the estimated average thickness of the concrete of 1.3 feet (110 x 44 x 1.3 = 6,292 ft^3) plus the berm walls. The berm walls were calculated based on being 3 feet deep, six inches wide and 292 feet long or 438 cubic feet. The total volume then is 6,730 cubic feet.

The two 3,000 gallon storage tanks in the drain and flush area may be decontaminated if they are to be reused or scrapped otherwise, they will not be decontaminated. The drained PCB oils will be manifested to an EPA approved incineration facility for treatment. For closure cost estimate purposes it is assumed that the tanks will be disposed without prior decontamination at one of the Grassy Mountain facility EPA approved chemical waste landfill permitted to accept PCB solid waste for disposal.

22.3.6. Auxiliary Equipment

Auxiliary equipment will be handled in accordance with 40 CFR 761 regulations. All movable equipment will be evaluated as to its intrinsic value versus cost of decontamination. If the decontamination cost of the equipment is estimated to exceed the item's intrinsic value, that item will be disposed of in accordance with its Closure Plan for Grassy Mountain facility PCB Warehouse One and Tank Farm regulatory classification. If the equipment is of sufficient value to warrant decontamination, it will be decontaminated per 40 CFR 761.79(c)(2). The equipment identified for decontamination includes forklifts, barrel grabbers, hand trucks, and pallet grabbers.

Spill pans and other items used to collect PCB liquids are cleaned in accordance with 40 CFR 761.79. Any auxiliary equipment not suitable for decontamination will be landfilled in an approved chemical waste landfill. It is anticipated that these materials will include items such as pipe, hose fittings, buckets, drip pans, tools and other material used in PPM operations. It is anticipated that the equivalent of 50 drums of equipment will be designated for landfill. A list of

typical auxiliary equipment is provided below along with their anticipated treatment. Equipment to be landfilled will be dismantled as much as practical and placed in a rolloff box or similar container for bulk shipment to an approved chemical waste landfill. This material will constitute less than 15 cubic yards and will take only one rolloff box or similar container.

Table O: Auxiliary Equipment

Description	Treatment Method
Forklifts	Decontaminate
Barrel Grabbers	Decontaminate
Slings	Landfill
Portable Scales	Landfill
Hand Trucks	Decontaminate
Pallet Grabbers	Landfill
Pallet Trucks	Landfill
Tools	Landfill
Hoses	Landfill
Pumps	Landfill
Storage Shed (Portable)	Landfill
Fittings	Landfill
Pipe	Landfill
Buckets, Drip Pans	Landfill
Spill Pans	Landfill
Brooms, Shovels	Landfill
Vacuums	Landfill

22.3.7. Post-Cleanup Verification Procedures

Sample location selection criteria, sampling methods (e.g. wipe tests, soil/concrete cores, etc.), analytical methods, QA/QC, sampling, equipment decontamination, and chain of custody for post cleanup verification shall be consistent with that of the Sampling Plan in Section 22.3.3.3.

Additionally, all PCB contaminated articles, debris, equipment, and associated material shall be handled in accordance with 40 CFR 761 regulations. Where practical, sampling equipment will be double wash/rinsed with an approved solvent. All contaminated solvent rags, debris, and associated material will be containerized and disposed of in accordance with 40 CFR 761 regulations. Volumes and disposal methods of material generated in the cleanup are provided in Section 22.3.4.

Disposal facilities for PCB materials generated during clean up are anticipated to include, but not be limited to those shown in Table G.

22.4. Other Closure Activities

22.4.1. Leachate Management

22.4.1.1. Apply leachate management during closure activities only to the land disposal units.

22.4.1.2. Manage leachate and leachate collection and removal systems in accordance with Module VI of the facility permit and applicable regulations.

22.4.1.3. Monitor and maintain records for each leak detection/collection system in accordance with the requirements of Module VI of the permit.

22.4.1.4. Collect and store leachate in the leachate storage tanks prior to shipping the leachate off-site for disposal. This disposal method is assumed for closure cost estimate purposes. However, any appropriate treatment or disposal method available at the time of closure may be utilized at the discretion of the Permittee.

22.4.1.5. Perform all routine maintenance and repairs necessary for the proper operation of the leachate management system.

22.4.2. Ground-Water Monitoring

Because the disposal activities at this site are limited to PCB transfer and storage and associated activities and do not entail surface impoundment, fill, or any other surface applications of waste, it is not necessary to provide for ground water monitoring or run-on and run off controls.

22.4.3. Security Devices

See Section 22.1.3.11 for location and nature of security system. During closure, all areas of activity will be decontaminated to the levels required for non-restricted access areas. The facility will then be released for use for other commercial/industrial activities. Thus post-closure security devices will not be necessary to prevent access to this portion of the Grassy Mountain facility.

22.5. Schedule for Closure

Considering the remaining capacity of the facility, projected shutdown of related industrial plants, expiration of customer activity, which generates PCB waste for disposal, and the expected retirement date for the facility, it is anticipated that the expected year of closure for this facility will be 2031. However, because of the nature of the PCB industry and PCB waste regulations, closure may begin later in order to provide the disposal capacity for PCBs that may then still be required.

After the start date of closure activities has been determined, the closure schedule shown below in Table I shall be followed. The Regional Administrator and the Director of the Division of Waste Management and Radiation Control.
shall be notified at least 60 days prior to the beginning of closure activities, however, closure activities may commence before the end of that sixty days. The schedule below indicates the

activities and actions to take place after closure is initiated. The day closure activities are initiated is assumed to be day one.

Table P: Anticipated Closure Schedule

Activity	Day
A. Container Storage Areas	
Inventory Removal	15-45
Area Decontamination/Removal/Disposal	45-70
Sampling	70-80
B. Auxiliary Equipment	
Decontamination and/or Disposal	1-70
C. Closure Certification, Monitoring	
Follow-Up Decontamination (If Necessary)	80-100

22.6. Modification to Closure Plans

Closure plans will be amended and then submitted to the agency for approval if a change in operating plans or facility design affects the closure plan, for example:

- Increases in facility size and/or capacity;
- Increases in the estimate of maximum inventory;
- Changes in regulatory requirements that affect closure activities;
- Changes in surrounding land use (e.g. drinking water wells are installed in close proximity to the facility or sewer extensions increase the possibility of contaminating sewage treatment plant operations in the event of a spill);

An unexpected event occurs while conducting final closure activities that affects the closure plan; there is a change in the expected year of closure; or financial status changes that may result in an inability to adequately pay for closure.

E. CLOSURE AND POST-CLOSURE PLAN FOR CELL B/6

23.0 CLOSURE CAP LAYOUT AND GENERAL DESCRIPTION

A final cover for the cell is designed to provide long-term minimization of migration of liquid through the closed landfill; function with minimum maintenance; promote drainage and minimize erosion or abrasion of the cover; accommodate settling and subsidence so that the cover's integrity is maintained; and cap a liner system that has a permeability less than or equal to the permeability of any bottom liner system or natural sub-soils present. The closure cap for TSCA/RCRA Landfill Cell B/6 has been designed taking into consideration these requirements. The "Construction Quality Assurance (CQA) Plan for Landfill Construction and Closure" is presented as an addendum to Appendix 1, Design and Engineering Report. The CQA Plan presents specifications for closure cap materials, including clay, GCL and synthetic liners, drainage net, filter fabric, soil cover, and gravel. The CQA Plan establishes procedures for installation, visual inspection, monitoring, and testing of the different elements of the closure cap.

The closure cap of Cell B/6 will consist of two feet of compacted clay or a geosynthetic clay liner (GCL), a HDPE geomembrane liner with a drainage system above the liner, a protective cover over the liner and drainage system, and gravel armor plating over the protective cover for erosion protection. The closure cap will be constructed in the general shape of a "hipped roof or elongated pyramid, with the cap surface sloping toward the outer edges of the cap at maximum slope of approximately 5 percent. Grading the closure cap as proposed will assist in accommodating settlement and subsidence so that the cover's integrity is maintained. At the proposed slopes of five percent, the cap could settle or subside and additional three feet over a horizontal distance of 100 feet and still maintain a slope of approximately two percent, thus, promoting drainage off the surface of the cap. Downspout pipes will be located at each of the four comers of the closure cap to convey precipitation runoff from the closure cap down the exterior slopes of the cell to drainage conveyance ditches and to retention ponds.

24.0 DESIGN

Typical cross-sections of the closure cap are illustrated in the TSCA/RCRA Landfill Cell B/6 Closure drawings. The closure cap will consist of the following:

- A final waste surface that has been graded, compacted and prepared to receive compacted clay cap material or a final waste surface that has been graded and cleared of all objects that may damage the overlying geosynthetic clay liner (GCL) and synthetic liners, that is smooth and that has been brought to its final grade.

- A 2-foot thick compacted clay cap with a maximum in-place saturated hydraulic conductivity (permeability) of 1 x 10^{-7} cm/sec. or a geosynthetic clay liner (GCL), which has equivalent or improved permeability characteristics to the two feet of compacted clay.

- A 60-mil HDPE geomembrane liner. Since the cap will consist of a geomembrane liner, it will have a permeability that is less than or equal to the permeability of the bottom liner system in the cell.

- A middle drainage layer consisting of drainage net with overlying geotextile filter fabric. The middle drainage layer will convey water off the underlying geomembrane liner, which percolates through the overlying cap materials. The drainage net will be placed on a slope, which parallels the surface of the closure cap. The edge of the drainage net will extend into the more permeable erosion protective cover material on the 2H: 1V exterior slopes around the perimeter of the cap to allow water that enters the drainage net to drain freely. The drainage net will consist of the Gundle XL-14 or some other drainage net that has equivalent or improved transmissivity characteristics to Gundle XL-14. Gundle XL-14 drainage net has a transmissivity of about 4.5×10^{9} m^2/sec. with a loading of 6,500 pounds per square foot, and a five percent hydraulic gradient.

- A 2-foot protective cover that will provide frost protection for the liner and that will be compatible with the geosynthetic liner if used. The regional depth of frost penetration is about 21-inches at the Grayback Facility. The protective cover and gravel armor plating thickness should, therefore, provide adequate frost protection.

- Erosion protective cover consisting of four inches of gravel armor plating material over the entire cap. Gravel will be used instead of vegetation due to the sparse nature of local vegetation. Annual rainfall is quite low and will not support vegetation thick enough to prevent erosion of the cap. Native vegetation will begin to grow by itself in the gravel layer as verified by the growth of native vegetation in the gravel armor plating that has previously been placed as erosion protection on the slopes and closure caps of the other landfill cells at the facility. Due to the aridity of the region, no deep-rooted vegetation is expected to develop which might penetrate the HDPE liner.

- Berms, ditches, downspout pipes, storm drainage pipes and other drainage facilities to control and convey runoff from the cap. Berms will be constructed around the perimeter of the cap, which will form ditches around the perimeter on top of the cap. The ditches will be graded on a slope of about 0.7 percent toward the four comers of the closure cap. The ditches will collect precipitation runoff from the surface and convey the runoff toward corrugated polyethylene pipe downspouts located at the corners of the cap. The cell down-spouts and existing manhole drainage systems located at the corners of the cap will convey runoff to drainage ditches at the base of the landfill and to drainage ditches that lead to the storm water retention pond. The cell down-spout pipes located at the north-center, and northwest corners of the cap will convey runoff from approximately the western ¾ of the north half of the cap, through culverts, to ditches located along the exterior toe on the south side of Cell X and Z which then conveys the runoff to a ditch on the toe of the east embankment of Cell B/6; which eventually leads to a containment pond south of the southeast corner of the cell. The downspout pipe located at the northeast corner of the cap will convey runoff from the northeast quarter of the cap to the ditch along the eastern

embankment, then south to the same containment pond. The three downspouts on the southern side of Cell B/6 all drain into a ditch at the toe of the south embankment of the Cell which drains into the pond off the southeast corner of Cell B/6.

25.0 CLOSURE ACTIONS

25.1. Preparation of the Waste Mound

The waste surface at the top of the cell must be amenable for closure. Proper selection, compaction, slope and grading of the waste are necessary to ensure the integrity of the cap design. If a GCL is used as an alternate to two feet of compacted clay cap material, incoming waste free of sharp objects and debris will make up the final lift in the cell in order to protect the overlying GCL and HDPE liner. The cell will be shaped and contoured to conform to the final grading plan for the waste. The cap will be graded at a maximum slope of approximately 5 percent. The contouring of the waste will reduce the subsequent need for additional fill material, facilitate grading of the cap, and reduce the possible formation of depressions that could pond water if the GCL is used as an alternate to compacted clay.

25.2. Compacted Clay or Geosynthetic Clay Liner (GCL)

If a compacted clay cap is used, the method of placement will be determined by constructing a test fill(s). The same compaction equipment and methods used to construct an approved test fill(s) will be used during placement of the compacted clay cap. An approved test fill(s) will result in a maximum in-place saturated hydraulic conductivity of 1×10^{-7} cm/sec. If a GCL is used in place of a compacted clay cap, placement of the GCL will be initiated and will progress such that drainage of precipitation runoff from the closure cap and from the adjacent waste material will be away from the GCL. The HDPE liner will immediately be placed above the GCL to prevent moisture resulting from precipitation from coming into contact with the GCL.

25.3. HDPE Liner

A 60-mil HDPE geomembrane liner will be installed above the compacted clay or GCL. The HDPE liner in conjunction with the underlying compacted clay or GCL will provide for the long-term minimization of liquid migration through the closed cell.

25.4. Drainage net and Filter Fabric

Drainage net will be placed on top of the HDPE liner to function as a drainage media for water that infiltrates the surface soil. A layer of geotextile filter fabric will be installed directly above the drainage net to prevent clogging of the drainage net by the overlying soil. The drainage net and the filter fabric will be installed at the same time as the protective cover. The drainage net will be placed on a 5 percent slope, which parallels the surface of the final cover. The edge of the drainage net will extend through the soil cover around the edges of the cap to allow discharge from the drainage net to drain freely. The drainage layer consists of Gundle XL14 (or other drainage nets that are approved in meeting or exceeding drainage criteria of the Gundle XL-14 drainage net) underlying a Polyfelt TS-700 filter fabric or equivalent.

25.5. Protective Cover

A 2-foot thick protective cover layer will be placed over the drainage layer. It is anticipated that the protective cover meeting the Unified Soil Classification designations ML, CL, SM, SC or

combinations thereof may be obtained from borrow sources near the Grayback Mountain Facility.

25.6. Erosion Protective Cover

The erosion protective cover across the entire cap, including the berms and exterior 2H: 1V slopes around the perimeter of the cap, will consist of a 4-inch layer of gravel armor plating material.

25.7. Schedule of Events

The U.S. EPA and the Division will be notified sixty (60) days prior to the date that closure of Cell B/6 is expected to begin. The following is an approximate schedule for closure of Cell B/6:

Day 0	Receipt of final volume of waste needed to reach mound capacity; begin work force mobilization and continue compaction and grading of waste materials.
Day 60	Begin placement and compaction of clay and GCL cap.
Day 90	Complete placement, compaction, and grading of waste materials.
Day 105	Complete placement of clay or GCL cap.
Day 165	Complete placement of HDPE liner.
Day 210	Complete placement of drainage layer and grading of soil cover.
Day 240	Rock cover placed and final drainage completed.
Day 265	Closure completed and certified.

This schedule is based on the assumption that weather conditions will not interfere with closure activities. In the event that adverse weather conditions (e.g., wind storm) disrupt closure operations, a revised closure schedule will be prepared and provided to U.S. EPA and the Division.

25.8. Closure Cost Estimate for Cell B/6

See the summary table for the Closure Cost Estimate for Cell B/6. For the purpose of calculations, it is assumed that the cells to be closed will be filled with wastes that have been approved for disposal in the cell to the operating capacity and then mounded. Worksheet CLO-1 presents an estimate of the closure costs based on the actual closure costs of Cell Y in 1997, anticipating the use of a geosynthetic clay liner. Inflation factors for each year were used to adjust the closure cost to current dollars. Worksheets CLO-2 presents an estimate of the required quantity of closure materials. CLO-3 presents the total leachate and groundwater monitoring costs for a closure period of one year. CLO-4 presents the unit costs associated with decontaminating and disposing of leachate. CLO-5 presents the costs of disposing of all PCB cell leachate collected during a one year closure period and assumes all leachate must be decontaminated and disposed off-site even though it may be solidified and place in any active TSCA/RCRA cell. The total estimated cost for closing Cell B/6 and continuing post-closure activities is $3,223,660 in 1999 dollars.

26.0 POST-CLOSURE CARE PLAN

The Permittee will provide post-closure care and leachate monitoring of the cell for thirty (30) years, beginning when certification is obtained that the cell has been closed in accordance with

this closure plan. The Permittee will provide Post-Closure groundwater monitoring of each Waste Management Area (WMA), as defined in the RCRA Closure Plan Module VII, for thirty (30) years, beginning when certification is obtained that the last cell in the given WMA has been closed in accordance with this closure plan.

Post-closure care for Cell B/6 will be incorporated into the in the inspections and maintenance performed until the facility is closed. Post-closure care and monitoring will consist of semi-annual inspections of grading, security fencing, surface water drainage and containment dikes, and leachate collection systems. Groundwater monitoring well and leachate sampling and analysis events will take place semi-annually for closure years 1-5 and annually for years 6-30. Except for frequency and the identification of wells to monitor, the groundwater monitoring program, as outlined in the most recent revision of the operating approval, will be followed.

The location of the wells is such that the migration of hazardous constituents beyond the point of compliance will be detected if such were to occur. If hazardous constituents were to be detected, the notification and corrective actions outlined in the most recent operating approval would be followed.

Either on-going operations or the person selected to oversee post-closure will provide for the continued integrity of the clay cap and final gravel cover, runoff containment dike, and ground-water monitoring wells. There will be no post-closure use of Cell B/6 that will disturb the integrity of the final cover, containment system, or ground-water monitoring wells.

The facility will maintain a copy of this Cell B/6 Closure and Post-Closure Plan. The plan will be available for review at any time during the closure period.

The anticipated post-closure contact for the facility is stated below. During the post-closure care period, correspondence should be directed as follows:

Vice President of Operations
Clean Harbors Environmental Services, Inc.
42 Longwater Drive
P.O. Box 9149
Norwell, Massachusetts 02161-9149
(781) 792-5000

The leachate collection system riser pipes will be visually inspected for defects and wear or damage. Repairs or replacement will be performed as necessary. Warning signs will be inspected and maintained or replaced as necessary to prevent the unknowing entry of unauthorized personnel.

The rock cover over the closed cell will be inspected for any signs of erosion, burrowing rodent activity or depressions caused by secondary consolidation. Any damaged or eroded areas will be renovated as necessary. Appropriate control measures will be carded out if it is discovered that any burrowing rodents have taken up residence on the cell. Appropriate rodent control measures include trapping and the use of rodenticides. Appropriate control measures will be taken as

needed to prevent the growth of woody or deep-rooted plants whose roots may penetrate and thus damage the synthetic or clay liners. Possible plant control measures include the use of soil sterilant or physically removing the plants. At closure, the cap will provide sufficient weight to prevent liner deformation.

During closure, leachate will be pumped, quantified and sampled at the same frequency as required and analyzed for the same parameters as in the most recent operating approval. During post-closure, leachate will be pumped and quantified according to the following schedule:

POST-CLOSURE YEAR	FREQUENCY
1	Weekly
2-3	Bi-Weekly
4-5	Monthly
6	Bi-Monthly
7	Quarterly
8	Semi-Annually
9-30	Annually

The facility may petition U.S. EPA and the Division for a different pumping schedule based on the history and quantity of leachate produced.

Leachate from the upper collection systems will be sampled semi-annually for post-closure years 1-8 and annually for years 9-30, and from the secondary and tertiary sumps, quarterly for years 1-5, semi-annually for years 6-8, and annually for years 9-30. The samples will be analyzed for the PCBs and chlorinated organics.

Frequency of Leachate Inspections and Pumping				
	Inspection Schedule	Leachate Detected	Leachate Pumped	Change In Schedule
Closure Initiated	1 time/week	Yes	Yes	Maintain[7] Increase[8]
		No	No	Decrease[9]
Post-Closure	Semi-Annual	No	No	Maintain[10]

[7] Maintain inspection schedule if pumping frequency keeps pace with the volume of leachate produced.
[8] Increase inspection schedule if pumping frequency does not keep pace with the volume of leachate produced.
[9] Decrease inspection schedule if there is insufficient head for the pump to operate.
[10] Inspection frequency has tapered off to a semi-annual frequency.

All leachate will be transferred to a tank or tanker for disposal or treatment as per the TSCA and RCRA regulations effective at that time. If off-site disposal/treatment is required, sufficient volume will be collected for transportation to a permitted off-site disposal facility.

All sampling and testing procedures will be performed in accordance with the appropriate regulations and standards required at the time. Records of the analysis and ground-water surface elevations will be retained throughout the post-closure care period. Copies will be provided to the U.S. EPA and the Division upon request. Post-closure care will continue for thirty (30) years from cell closure unless specified otherwise in this document or a petition to the contrary is approved according to the guidelines specified by the U.S. EPA or the Division. The person designated to supervise post-closure care will keep the post-closure plan.

The post-closure plan will be amended when there are changes in operating procedures or facility design, which render the current plan incomplete or incapable of meeting the post-closure plan standard. The plan will be reviewed as appropriate and amended within sixty (60) days after changes or events occur which warrant an amendment.

26.1. Notice to Local Land Authority

Within ninety (90) days after closure is complete, the Permittee will submit to the U.S. EPA and the Division, and the Tooele County recorder, a survey plat indicating the location and dimensions of the closed cell with respect to the surveyed benchmarks. This plat will be prepared and certified by a professional land surveyor. The plat will be filed with the land office and contain a prominently displayed attachment which states that the Permittee has an obligation to prevent disturbance of the site. A record of the type, location, and quantity of wastes disposed in the cell will be submitted to the above agencies.

27.0 POST-CLOSURE COST ESTIMATE FOR CELL B/6

See the worksheets at the end of this section, which provide details for developing the post-closure costs for Cell B/6, and include leachate pumping and treatment costs. After closure, the results of inspections and leachate sampling will be reported annually. The results of groundwater sampling will be reported annually. This estimate of post-closure cost is based upon estimates received from independent contractors. The total estimated cost of post-closure over 30 years for Cell B/6 is $2,446,553.

27.1. Annual Update of the Closure/Post-Closure Cost Estimate

The closure and post-closure cost estimates will be adjusted for inflation by July 15th of each year. The estimate is adjusted by multiplying the previous estimate by a ratio of the latest published Gross National Product (GNP) Implicit Price Deflator divided by the Deflator used the previous year. The annual GNP Implicit Price Deflator is published by the U.S. Department of Commerce, Economics and Statistics Administration, Bureau of Economic Analysis.

TABLE 1: Summary of Closure/Post-Closure Costs for Cell B/6	
Closure Costs	
CLO-1: Landfill Cover and Closure	$2,441,680
CLO-3: Groundwater and Leachate Monitoring Costs During Closure Activities	$41,898
CLO-4: Closure Maintenance Activities	$182,610
CLO-5: Leachate Collection, Treatment, Storage and Disposal	$96,170
Sub-Total Closure Costs for Cell B/6:	$2,762358
Contingency (10%):	$276,236
Total Closure Costs for Cell B/6 in 2010($):	**$3,038,594**
Post-Closure Costs	
PCLO-1: Post-Closure Ancillary Costs	$1,950,012
PCLO-2: Post-Closure Leachate Collection, Treatment, Storage and Disposal	$213,403
Sub-Total Post-Closure Costs for Cell B/6:	$2,163,415
Contingency (10%):	$216,342
Total Post Closure Costs for Cell B/6 in 2010($):	**$2,379,757**
Closure/Post-Closure Costs Combined	
Total Closure/Post-Closure Cost in 1997 ($) for Cell B/6:	**$5,670,213**
Total Closure Cost in 1998 ($) [Inflation Factor of 1.0166]:	**$5,764,338**
Total Closure Cost in 1999 ($) [Inflation Factor of 1.0111]:	**$5,828,323**
Total Closure Cost in 2000 ($) [Inflation Factor of 1.0145]:	**$5,912,833**
Total Closure Cost in 2001 ($) [Inflation Factor of 1.0218]:	**$6,041,733**
Total Closure Cost in 2002 ($) [Inflation Factor of 1.02399]:	**$6,186,674**
Total Closure Cost in 2003 ($) [Inflation Factor of 1.01653]:	**$6,288,940**
Total Closure Cost in 2004 ($) [Inflation Factor of 1.01831]:	**$6,404,090**
Total Closure Cost in 2005 ($) [Inflation Factor of 1.02096]:	**$6,538,320**
Total Closure/Post-Closure Cost in 2010 ($) for Cell B/6:	**$5,418,351**

CLO-1 WORKSHEET: Estimated Cell B/6 Closure Cost	
Berm Soil Sampling and Excavation, Mound Preparation, Geosynthetic Liner, HDPE Geomembrane (60 Mil), Drainage Net Installed, Non-Woven Geotextile Installed, Soil Protective Cover, Gravel Armor Cover, Engineering QA/QC, Testing, Surveying, Certification. Cell B/6 acreage is 17.11	
CLO-1: Landfill Cover and Closure	**$2,441,680**

CLO-2 WORKSHEET: Cell B/6 Dimensions	
Cell Perimeter	3,828 Feet
Surface Area of Closure Cap (Approximate)	82,809 $Yards^2$ 745,280 Ft^2 17.11 Acres
Geosynthetic Liner Thickness	2 Feet
Estimated Volume of Compacted Clay Cap	55,206 $Yards^2$
Thickness of Soil Protective Cover	2 Feet
Estimated Volume of Soil	55,206 $Yards^2$
Thickness of Gravel Armor Cover	4 Inches
Estimated Volume of Gravel Armor Cover	9,201 $Yards^2$

CLO-3 WORKSHEET: Groundwater & Leachate Monitoring Costs During Closure Activities	
Number of Annual Events During Closure	1
Total Analytical Costs Per Event ($23,193/Event) (Includes all TSCA Cells)	$23,193
Annually, leachate is sampled once from each primary,seconday and tertiary sumps. This constitutes one annual event. ($3,465/Event) (Includes all TSCA Cells)	$3,465
Semi-Annual Performance Evaluation Costs ($1,176/Event) (Includes all TSCA Cells)	$2,352
Labor and Reporting Costs Per Annual Event ($12,888/Event) (Includes all TSCA Cells)	$12,888
Total Groundwater & Leachate Monitoring Costs During Closure:	**$41,898**
Note these costs are for all TSCA Cells, including those cells that have already been closed.	

CLO-4 WORKSHEET: Closure Maintenance Activities	
Well System Maintenance Cost During Closure Annual well maintenance for 24 wells on Cells B/6, X, Y and Z. Annual well maintenance was estimated by Safety-Kleen in 1999. (Includes all TSCA Cells)	$426
Leachate System Maintenance Cost During Closure Number of sumps is 52. Annual number of pumps needing replacement is 20 based upon historical information. Unit cost of pumps is $555. Man-hours to replace pump is 2. Labor rate is $50/hour. (Includes all TSCA Cells)	$26,200
Run-On/Run-Off Maintenance Cost During Closure Involves the routine maintenance of the erosion and degradation of the landfill or other required cover structures, run-off trenches and piping and collection basins. Worst case is 8 hours per day of maintenance crew with 1 laborer ($20/hr), 1 operator ($30/hr), 1 backhoe/loader ($65/hr). One day cost is $920/day. Frequency of maintenance is 1 day per month for 24 months. (Includes all TSCA Cells)	$22,080
Security Cost During Closure Security and site inspection is expected to be maintained as currently required during the active site closure (i.e. decontamination, cover placement, etc.) of the facility. This would require security at the main gate during operating hours. It is expected that this will be necessary during the first 12 months of closure. Since the remainder of the closure effort (placement of landfill final cover) will take place after all probable exposure to hazardous constituents has been removed no continuation of security at this level is expected. The cost of security personnel, including all payroll and overhead requirements, have been computed as 8 hr/day, 260 days total, Fraction of TSCA Cells (4 TSCA from 12 on-site cells is 0.33), at $17.80/hr. (Includes all TSCA Cells)	$12,218
Routine Inspection Cost During Closure Security and site inspection is expected to be performed as a function of facility maintenance. This would require one 8 hour workday once per month during the post-closure period. It is expected that this effort will coincide with the annual administrative certification report of compliance with the post-closure requirements. Any reporting effort will be coordinated with the appropriate authorized party during the post-closure period. Inspection time is 8 hours per day, once per month for 12 months. Cost is $65/hr. (Includes all TSCA Cells)	$6,240
Mobilization/De-Mobilization of Equipment Cost During Closure The heavy equipment expected to be utilized in the general closure process has been assumed to be hired. Some equipment function will be mobilization over public highway, and thus mobilization is part of its function and has been included in the cost estimate. Current mobilization cost for tractor/flatbed trailer transport from Salt Lake City was obtained from Knight Transportation (1999) is $375/one way or $750 per trip. 2 to include demobilization can then multiply the total mobilization cost. Conservatively, typical mob/de-mob for each piece of equipment would not exceed $1,500 per unit. Number of trips is 6. (Includes all TSCA Cells)	$9,000
Equipment Decontamination and Disposal Cost During Closure Number of units to be decontaminated is 4. Unit cost of decontamination is $500. Decontamination residual generated is 200 gallons per unit. Total gallons generated are 800. Density of residual is 9.9 lbs/gallon. Total pounds generated are 7,920. Transportation cost is $650 per 5,000 gallons. Unit cost for incineration at Aragonite is $0.50/lb. (Includes all TSCA Cells)	$6,610
Truck Wash Station Decontamination and Disposal Cost During Closure At completion of facility, equipment and general decontamination, the truck wash units will be decontaminated. This area is ancillary to permitted units and requirement for housekeeping practices. The decontamination residuals generated will be disposed in accordance with the closure plan. Two truck washes need decontamination. Size of each area to be decontaminated is 5,500 $feet^2$. Total area is 11,000 $feet^2$. Unit cost for decontamination wash down is $2.07/$feet^2$. Total decontamination cost is $22,770. Decontamination residual generation rate is 2.6 gallons/$feet^2$. Total generated gallons Unit cost of decontamination is $500. Decontamination residual generated is 200 gallons is 28,600. Unit disposal cost is $0.96 per gallon. Total estimated cost to transport off-site for treatment and disposal is $27,521.	$50,291
Total Cost of Closure Maintenance Activities:	**$182,610**

CLO-5 WORKSHEET: Leachate Collection, Treatment, Storage and Disposal	
Leachate Collection, Treatment, Storage and Disposal Cost During Closure Leachate management involves the removal, decontamination through carbon filters, storage and assumed off-site transport to the Los Angeles Service Center of all leachate expected to be generated during the closure period. The current operation pumps the leachate from all cells to a portable tank unit, which is then pumped to TSCA cell solidification tank for solidification and disposal in the TSCA cell. Average TSCA Leachate produced from Cell B/6 per year is 87,730 gallons. Annual cost of leachate pumping and transfer is $7,311, based upon 20 gal/min. x 4,387 minutes x $50/hr. and doubled to include transfer time. Unit cost of off-site transportation and disposal is $0.96/gallon. Leachate volume is based on 239.7 gallons/day average during December 2000 in Cell B/6. Assuming leachate volumes produced in Cell B/6 follow the pattern of Cell Y. See the TSCA Closure Plan for details.	$91,532
Transportation Cost During Closure Transportation to the Aragonite incineration facility is $265 per 5,000 gallons. And this would require 17.5 loads.	$4,638
Total Leachate Collection, Treatment, Storage, Disposal:	**$96,170**

PCLO-1 WORKSHEET: Post-Closure Ancillary Costs	
Groundwater Monitoring – Semi-Annual Annual for years 3-8 (CLO-3). Years 1 and 2 are included in the Closure Cost Estimate and will not be included in the Post-Closure Cost estimate. Therefore, 6 years x $44,898/year with 1 events per year.	$269,388
Groundwater Monitoring – Annual Annual for years 9-30 (CLO-3). Years 1–2 are included in the Closure Cost Estimate and will not be included in the Post-Closure Cost estimate. Therefore, 22 years x $44,898/year with 1 event per year.	$987,756
Leachate System Maintenance Average over 28 years post-closure is $13,100/year (CLO-4).	$366,800
Cap Maintenance Includes the routine maintenance of the erosion and degradation of the landfill covers o other required cover structures, run-off trenches, and/or piping and any collection basins. The number of crew days required annually for routine maintenance is based upon the overall post-closure schedule. Hourly cost of maintenance crew is $155/hr. for 8 hours/day for 10 days. (This includes all TSCA Cells).	$9,200
Routine Inspections Includes security and site inspection is expected to be performed as a function of facility maintenance. This would require one 8 hour day per month during the post-closure period. It is expected that this will coincide with the annual administrative and certification report of compliance with the post-closure requirements. Any reporting effort will be coordinated with the appropriate agency. Therefore, 8 hours/month x $65/hour x 12 months x 28 years. (This includes all TSCA Cells).	$174,720
Annual Independent PE Review During the post-closure period an annual report will be prepared by the Permittee or designated third party, which documents all of the activities for each hazardous waste management unit (HWMU) at the facility during each one year period. These documents will include copies of all other reporting requirements including site inspections, leachate generation, manifest documents for leachate management, groundwater monitoring results, etc. These documents will be maintained at a designated repository for use by the certifying authority at the end of the 30 year post-closure period for each HWMU. For estimating purposes, this report is assumed to be prepared by the independent professional engineer documenting the post-closure activities. The following information is the estimate for effort in complying with this requirement. The of post-closure activities inspection time Engineering Staff (ES) is estimated to be 184 hours per year for all the TSCA cells considering site location and tasks delineated. Inspection/management time annually by a Professional Engineer (PE) is estimated to be approximately 20 hours. Other technical staff (ES) support task contributions are expected to be 50% of the effort spent a site inspection tasks. Approximately 33% of the time of this shall be allocated to Cell B/6. ES is $85/hour for 90 hours. Support is 45 hours. Total ES is $11,475/year. PE is $125/hour at 10 hours. Total PE is $1,250/year. Miscellaneous expenditures are 15% of the total or $1,909 per year. This is for 28 years x 33% for Cell B/6.	$135,218
Certification Documents by PE The final certification for each HWMU to meet the requirements of Utah Admin. Code R315-8-7 will be compiled utilizing the annual documents outlined hereinbefore. It is expected that this review will require approximately 30 hours by professional staff for each unit as the 30 year period is completed. In addition to this will be the required administration and documentation to accompany the certification, which is estimated to cost approximately 40% of the professional staff fees. There are currently 8 units, which will be subject to post-closure certification. This is a one time cost and is 33% of the total for Cell B/6 only. The total for all TSCA Cells is $21,000.	$6,930
Sub-Total Post-Closure Costs:	**$1,950012**
Administrative and Contingency Costs (10%)	$195,001
Contingency for Potential Corrective Action (10%)	$195,001
Total Post-Closure Costs:	**$2,340,014**

PCLO-2 WORKSHEET: Post-Closure Leachate Collection, Treatment, Storage and Disposal	
Leachate Collection, Treatment, Storage and Disposal Cost During Closure Leachate management involves the removal, decontamination through carbon filters, storage and assumed off-site transport to the Aragonite incineration facility of all leachate expected to be generated during the closure period. The current operation pumps the leachate from all cells to a portable tank unit, which is then pumped to TSCA cell solidification tank for solidification and disposal in the TSCA cell. Average TSCA Leachate produced from Cell B/6 per year is 87,730 gallons. Annual cost of leachate pumping and transfer is $7,311, based upon 20 gal/min. x 4,387 minutes x $50/hr. and doubled to include transfer time. Unit cost of off-site transportation and disposal is $0.96/gallon. Leachate volume is based on 239.7 gallons/day average during December 2000 in Cell B/6. Assuming leachate volumes produced in Cell B/6 follow the pattern of Cell Y. See the TSCA Closure Plan for details. The post-closure leachate collection volume will be a total of 210,524 gallons for Cell B/6. At $0.96/gallon for disposal and transportation of $265 per 5,000 gallons this would require 42 loads. Transportation expense will be $11,300. Disposal is $213,403.	$213,403

28.0 FINANCIAL ASSURANCE MECHANISM

28.1. Financial Assurance for Closure (40 CFR 264.143 & 264.146)

In accordance with the regulations cited above, Clean Harbors Grassy Mountain, LLC., as the owner/operator of the Grassy Mountain facility, is required to provide assurances that there will be funds available to close the facility at some time in the future. The purpose of these assurances is to guarantee that closure can be performed by a third party, if for some reason Clean Harbors Grassy Mountain, LLC. is unable to do so itself. This figure will be updated at least annually in response to inflation, and as often as needed to reflect changes at Grassy Mountain.

There are six different methods allowed by the rules to guarantee the Closure Costs:

- Closure Trust Fund
- Surety Bond Guaranteeing Payment into a Closure Trust Fund
- Surety Bond Guaranteeing Performance of Closure
- Closure Letter of Credit
- Closure Insurance
- Financial Test and/or Corporate Guarantee.

Clean Harbors Grassy Mountain, LLC. shall use one of these as the financial assurance mechanism for the Grassy Mountain facility. The financial assurance documentation or certification of such documentation is maintained at the office of the Division of Waste Management and Radiation Control. Clean Harbors Grassy Mountain, LLC. shall remain in compliance with the applicable provisions of 40 CFR §264.143 as they relate to the mechanism used for the financial assurance mechanism for closure.

28.2. Financial Assurances for Post-Closure (40 CFR 264.144 & 264.146)

In accordance with the regulations cited above, Clean Harbors Grassy Mountain, LLC., as the owner/operator of the Grassy Mountain facility, is required to provide assurances that there will be funds available to maintain the facility through the post- closure period. The purpose of these

assurances is to guarantee that post-closure care can be performed by a third party, if for some reason Clean Harbors Grassy Mountain, LLC. is unable to do so itself. This figure will be updated at least annually in response to inflation, and as often as needed to reflect changes at Grassy Mountain.

There are six different methods allowed by the rules to guarantee Post-Closure Care:

- Post-closure Trust Fund
- Surety Bond Guaranteeing Payment into a Post-Closure Trust Fund
- Surety Bond Guaranteeing Performance of Post-Closure Care
- Post-Closure Letter of Credit
- Post-Closure Insurance
- Financial Test and Corporate Guarantee for Post-closure Care.

Clean Harbors Grassy Mountain, LLC. shall use one of these as the financial assurance mechanism for Grassy Mountain. The financial assurance documentation or certification of such documentation is maintained at the office of the Division of Waste Management and Radiation Control. Clean Harbors Grassy Mountain, LLC. shall remain in compliance with the applicable provisions of 4.0 CFR §264.144 as they relate to the mechanism used for the financial assurance mechanism for post-closure.

28.3. Liability Requirements (40 CFR 264.147)

Clean Harbors Grassy Mountain, LLC. maintains liability insurance for sudden accidental occurrences, as required by the rules cited and Module II.Q.1. of the Clean Harbors Grassy Mountain, LLC., RCRA Permit. The certificate of insurance for the required liability insurance as specified by 40 CFR 264.147 is maintained on file at the office of the Division of Waste Management and Radiation Control.

29.0 SOIL SAMPLING PLAN

At closure of Cell B/6, the Permittee will sample the berm surrounding the cell (vehicular drive) in order to detect soils contaminated with PCBs in excess of 25 mg/kg (ppm) dry weight basis. If sampling reveals that soils have PCBs in excess of 25 ppm, the top ½ foot of soil in the contaminated area will be removed and land filled. After excavation, sampling will be repeated to ensure that contamination in excess of 25 ppm dry weight basis. PCBs has been removed. The excavated area will be filled with clean soil.

The berm road will be sampled using the hexagonal grid system outlined in the U.S. EPA-560/5-86-017 "Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup". Due to the operational success of the TSCA Cell X area, as analytically proven through a very extensive berm road sampling program, the proposed Soil Sampling Plan for subsequent cells will vary in it's approach. The hexagonal grid will be applied across the entire nominal width of each berm road. For example, for Cell Y, the hexagonal grid system for the North berm is applied to 13 foot by 13 foot (square) sections, while the West berm will have a 16 foot by 16 foot pattern.
closure.

Samples will only be taken at sampling grid points lying within the square. A total of five (5) soil aliquots will be "grabbed" within a given grid; one from each of the quadrants, and one consistently from the middle point. Samples will be taken to a maximum depth of one (1) inch (2.54 cm) by using an appropriate sampling device and the soil will be placed into a clean glass bottle, capped and labeled. The sample collection data will be entered into a field log book and on the chain-of-custody form.

If individual disposable sampling devices are not used for each composite sample ensemble, then the sampling device will be wiped with a disposable wipe cloth to remove any visible particles before taking the next sample. After each sample set, decontamination debris will be disposed in a bag intended for disposal of PCB-contaminated materials.

Composite samples will be used to represent each sampled grid because of the large number of samples to be taken. Composite samples will be prepared using the following method:

- An individual sample will be mixed in a "clean" stainless steel bowl.
- One hundred grams of soil will be "grabbed" from the bowl and placed in the composite sample jar.
- After all five individual samples from the same grid are mixed and sub sampled, the five-hundred grams of soil will then be again mixed in a clean stainless steel bowl and returned to the composite sample jar.

Since a localized likelihood of a massive PCB release to the surrounding berm perimeter is extremely unlikely, and because of monitoring of the PCB disposal operations in the TSCA Cells, and also relying upon the PCB disposal operations berm analytical data for the closed TSCA Cell X as a basis, the frequency of sampling will be every other grid location on a given berm. In this way, five representative samples taken from one 13’ x 13’ or 16’ x 16’ sampling grid will comprise one composite sample of homogeneous soil mixture for subsequent PCB analysis. This composite sample will be used to represent two (2) grid locations.

All samples will be retained until the results of the analyses reveal that PCB's are not present in concentrations greater than 5 ppm PCB's in the composite samples.

If analysis detects soils with PCB's in excess of 5 mg/kg (ppm), dry weight basis, in a composite sample, both grids adjacent to the composite sample grid will be sampled and submitted as individual composite samples to locate the actual area of contamination; alternatively, all three (3) grids suspected of PCB contamination will be excavated prior to re-sampling.

A detection of 5 mg/kg (ppm), dry weight basis, PCB in a composite sample could possibly indicate that one area sampled was contaminated with 25 mg/kg (ppm), dry weight basis, PCB. Excavation of areas smaller than 13’x13’ or 16’x16’ is not practical. The Permittee may elect to excavate the top six inches of berm material prior to any sampling because of the rocky nature of the berm road construction material. Collecting and compositing of grid samples in this manner will define the PCB contamination to specific grids and this process will continue until all of the

PCB contamination is identified for excavation, excavated and resampled for clean-up verification analysis.

Since PCB's are not readily dissolved in a water matrix, a six (6) inch soil depth is the recommended excavation depth from the berm surface for soils showing contamination. The TSCA Cell X sampling results confirm this strategy and documented earlier findings. Clean materials will then be backfilled into the excavated area once the area has been determined to be clean.

29.1. Quality Assurance and Quality Control - Soil Sampling Plan

Each sample taken will be logged into a field log book with a description of the area, coordinates of the sample location, time and date of sampling, type of sample taken, (i.e. soil), and initials of the sampler. Each sample will then be entered onto a chain of custody form. The chain of custody record will have the following elements: unique sample identification number; date of sampling; time of sampling; sampling method (i.e., composite, grab); matrix type; and initials of sampler.

29.2. Analytical Procedures

Samples taken at each TSCA Cell will be analyzed, extracted, and cleaned according to standard U.S. EPA protocols using a laboratory approved per the Disposal Cell Operating Approval. These may include SW846 methods for analyzing PCBs or the US EPA Contract lab Protocols (CLP). Specific Cleanup Procedures cannot be foreseen until the time of analysis.

29.3. Replicate Samples

Replicate samples help evaluate the precision of a method. They help quantify the uncertainty of an analytical value. Replicates can exist in the form replicate sample analysis or replicate spiked sample analysis. If no analytes are expected to be found in an analysis it is better to choose to do replicate spiked samples.

Replicates samples, usually a duplicate, are to be analyzed at a minimum frequency of 20% or according to the analytical method requirements, whichever is more frequent. For tests which are run infrequently (once a month) duplicates will be analyzed with each batch.

After a sufficient number of replicates for a given sample matrix have been accumulated, control limits will be established. Replicates which exceed the control limits indicate the need to reanalyze the associated sample batch.

Exceptions may be documented by re-spiking/re-analysis and written comment on laboratory bench sheet.

29.4. Blanks

Blanks demonstrate that the method is free from interferences or alternately, allow the analyst to monitor the background and keep it from reaching levels which would interfere with the detection and quantification of the target analytes. Blanks also serve to inspect the reagents used for contamination. If a reagent is found to be injecting unacceptable quantities of

interference into the measurement system, it needs to be replaced with a higher grade/interferant-free material.
Blanks are to be run with each sample batch or 1 for every 20 samples, whichever is more frequent. Analyte concentration in the blank should not exceed 2 times the method detection limit. 1f the level of blank contamination is constant and can be controlled, appropriate control limits can be established: Blank values must be recorded on an ongoing basis in this case.

29.5. Field Blanks

Field contamination evaluation will be accomplished by preparing field blanks. For every twenty (20) composites collected, the Permittee will collect one (1) field blank. The blank will be prepared in the field by pouring a commercially available sand over the entire sampling train. The sand will then be placed into a prepared bottle and shipped to the laboratory for analysis. By obtaining these samples, the Permittee can be assured that the sampling technique has not introduced contaminants to the samples.

The bottles into which the samples may be put will be purchased pre-cleaned from an appropriate vendor. The bottle will be purchased for the intended use (i.e., amber glass bottles suitable for semi-volatile analysis). Bottles will not be reused, thereby eliminating the possibility of cross-contamination.

29.6. Chain-of-Custody

The chain-of-custody form being used by the facility at the time of closure will be used.