

Revision History

Revision Date	Closure Plan (Text Body) Update Description	Closure Cost Estimate (Spreadsheet/Tables) Update Description	Other Notes/Updates	Thoughts/Analysis
1/27/2023	Responding to Division comments to the updated closure plan. Updated TOC to match the table titles in the appendix.			
3/23/2022	<p>In 2022 the Closure Plan body text received minor updates. These updates generally consisted of updating facility descriptions to reflect the the current status of facility infrastructure. This includes reflecting Cell 8 as an existing cell instead of a proposed unit, updating monitoring well counts, and other small edits to language and formatting. Some language relating to the cost of closing/post-closure for TSCA facilities was removed from the plan to reflect the adopted approach of only estimating costs under the RCRA/Utah permit. This simplifies the information provided in the cost estimation tables to only areas contributing to financial assurance under the permit and generally reduces confusion. Language was adjusted to indicate the estimate reflects costs for the entire facility groundwater monitoring program. The estimate nolonger attempts to distinguish or eliminate groundwater monitoring costs associated with TSCA. The order of the appendicies and tables were changed to provide summarized financial assurance information upfront and move less utilized data to the back.</p>	<p>Updates to the cost estimate make up the majority of the revisions made in 2022. Quantity and unit cost estimates for the closure/cap of Cells 7, 8, and B/6 are now based on cost estimate prepared by Clean Harbors (Faizur Khan) in 2021. Recieved contractor bids for the closure of Cell Z provided the basis for unit pricing in those estimates. Previously, pricing from the 2011 closure of Cell 5 provided the basis for those estimates. Other changes to the overall estimate approach included the removal of tables/estimates related to the closure/post-closure care of TSCA facilities. Previous versions featured inconsistencies in what facilities were included in the estimate and how they were summarized and reported. Now, RCRA and RCRA/TSCA facilities are summarized throughout the estimate as well as in the Financial Assurance Summaries (Appendix A) while TSCA facilities and PCB operations are excluded. Used Oil incineration was previously tied in with PCB operations but has been included here as RCRA cost obligation and separated out based on the historical use of a separate financial assurance mechanism. The estimate nolonger attempts to distinguish or eliminate groundwater monitoring costs associated with TSCA. It is assumed all costs associated with the groundwater monitoring program for the entire facility fall under the financial obligations of this permit. The cost estimate for groundwater monitoring was simplified relative to previous versions by assuming 2021 groundwater monitoring expenses are representative of the present value for annual monitoring during closure and post-closure.</p>	<p>Other updates made during this revision include but are not limited too: updating leachate production values to 2021 data, updating incineration and transportation costs, updating disposal costs, updating put-pile quantities and costs, updating CMF and leachate tank quantities/capacities, updating bulk storage area capacities, updating PPE usage and costs, updating stabilization treatment costs, updating and/or inflating equipment and labor costs, removing cost estimates associated with proposed Cells 9-13 and proposed Surface Impoundment B, updating amortized cost of airspace using 2022 Cell 8 pricing, updating well counts and monitoring demands, updating pricing for reporting and proffesional services. Many of these aspects were informed by a meeting with Grassy Mountain facility staff (Shane Whitney) and through referencing recent data and expenses while on site. Some approaches and pricing from previous versions were retained upon evaluation from the facility if the assumptions seemed appropriate.</p>	<p>Closure costs increased dramatically from previous years largely due to the inclusion of three cells requiring cap/closure (Cells 7, 8, B/6). Costs also increased due to the higher unit costs received on the 2021 Cell Z bids compared to the old basis of the 2011 Cell 5 closure. Post-closure care costs decreased significantly compared to previous estimates, primarily due to decreased leachate production volumes, lower pricing for groundwater monitoring assuming 2021 expenses, and through eliminating expenses associated with TSCA facilities that had been previously included.</p>

Table A.1

Table A.1 Financial Assurance Summary

Closure Cost Summary	(Table A.2)	\$21,713,809
Post-Closure Cost Summary	(Table A.3)	\$13,468,481
Used Oil Cost Summary	(Table A.4)	\$53,679
TOTAL		\$35,235,969

Table A.2: Closure Cost Estimate Summary

Closure Cost Estimate Summary		
Inventory Management of Hazardous Waste Treatment/Storage/Process Units	(Table B.6)	\$197,398
Hazardous Waste Management Unit (HWMU) Decontamination	(Table B.7)	\$535,127
Treatment and Disposal of Decontamination Residuals	(Table B.8)	\$280,619
Final Cover/Landfill Closure	(Table B.9)	\$15,124,407
Groundwater Monitoring During Closure Activities	(Table B.10)	\$323,258
Ancillary Closure Activities	(Table B.11)	\$1,943,854
Closure Certification	(Table B.12)	\$372,805
Container Management Facility Closure Cost (Table B.5 Less Admin. and Contingency Less Table C.6 Closure Certification)	(Table B.5 & Table C.6)	\$962,358
Subtotal Total Site-Wide Facility Closure Cost		\$19,739,826
Administrative and Contingency Costs (10%)		\$1,973,983
Total Estimated Present Worth (2022 \$'s) Of Closure Costs		\$21,713,809

Table A.3

Table A.3: Post-Closure Care Cost Estimate Summary

Post-Closure Care Cost Estimate Summary		
Annual Groundwater Monitoring	(Table B.10: CL0-5)	\$161,629
Annual Leachate Management Average Over 30-Years	(Tables C.7, C.8: CDA)	\$79,666
Annual Leachate Collection System Maintenance and Pump Replacements	(Table C.8: CDA)	\$69,925
Annual Cap Maintenance	(Table C.8: CDA)	\$16,926
Annual Routine Inspections	(Table C.8: CDA)	\$7,184
Annual Independent Professional Post-Closure Review/Certification	(Table C.8: CDA)	\$37,204
Subtotal Estimated Annual Facility Post-Closure Costs =		\$372,533
Annual Administrative & Contingency Costs (Table C.8: CDA)	10%	\$37,253
Annual, For Potential RFI's / Corrective Action (Table C.8: CDA)	10%	\$37,253
Total Estimated Present Annual Post-Closure Care Costs	(est. 2022 \$'S)	\$447,040
Total Present Worth of Annualized Post-Closure Costs (Annual Costs x Duration of Post-Closure)		\$13,411,200
Total Cost of Final Certification of Post-Closure Activities	(Table C.8: CDA)	\$57,281
Total Estimated Present Worth of Facility Post-Closure Care Costs =		\$13,468,481

Table A.4

Table A.4: Used Oil (RCRA) Disposal Summary		
(a) Askarel PCB Oil / Used Oil Disposal by Incineration at Aragonite:		
53,325 Gallons x 13.5 lb./Gallon	=	719,888 lbs.
Incineration unit cost (2018 Clean Harbors, Inflation Adjusted)	=	\$0.04 /lb
Incineration cost	=	\$28,796
(b) Askarel PCB Oil / Used Oil Transportation To Aragonite:		
Truck, Tank, and Driver Daily Cost (See Table C.3: CDA)	=	\$848.16 /Day
Number of Daily Loads	=	2 Loads/Day
Unit Cost per Load	=	\$424 /Load
Weight per Load	=	40,000 lbs.
Transportation Unit Cost	=	\$0.011 /lb.
Transportation Cost	=	\$7,632
(c) Water Disposal by Incineration at Aragonite:		
10,657 Gallons x 8.3 lbs. / Gallon	=	88,453 lbs.
Incineration unit cost (2018 Clean Harbors)	=	\$0.14 /lb
Incineration cost	=	\$12,541
(d) Water Transportation To Aragonite:		
Truck, Tank, and Driver Daily Cost (See Table C.3: CDA)	=	\$848.16 /Day
Number of Daily Loads	=	2 Loads/Day
Cost per Load	=	\$424 /Load
Weight per Load	=	40,000 lbs.
\$425 / Load / 40,000 lbs. (~5,000 Gal) / Load	=	\$0.011 /lb
88,453 lbs. x \$0.011 / lb.	=	\$938
(e) Personnel:		
Supervisor (1) Unit Cost (See Table C.3: CDA)	=	\$63
Daily Time	=	12 Hours
Number of Days	=	5 Days
Total Supervisor Cost	=	\$3,772
Labor to load tanker provided by transportation company		
Sub-Total Oil Disposal Charges		= \$53,679

**Table B.1: 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 D.1, TD01, Pad 2, TD02, DFBWO, SPAD in 55-Gallon Equivalents)	3,104
b.	Maximum inventory of containerized on-site management waste. (From Table D.1)	2,762
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 Table C.1: CDA for recontainerization fraction of 0.03)	96
b.	Re-containerization Unit Cost (See Table C.1: CDA) (\$/Container)	\$322
c.	TOTAL RE-CONTAINERIZATION COST [2a x 2b]:	\$30,903
3. CONTAINER MOBILIZATION		
a.	Number of pallets to be loaded for on-site disposal/transport. (1b x 0.25)	690
b.	Mobilization Unit Cost. (See Table C.1: CDA) (\$/Pallet)	\$33.43
c.	TOTAL CONTAINER MOBILIZATION COST [(3a x 3b)]:	\$23,067
4. OFF-SITE MANAGEMENT OF INVENTORY		
a.	Quantity of containers to be managed off-site (Table D.1):	342
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.)	5
d.	Transportation Cost, \$/Load to Aragonite (See Table C.1: CDA).	\$318
e.	Estimated Transportation Cost: (4c x 4d)	\$1,588
f.	Off-site incineration costs, \$/55-Gallon Equivalent (See Table C.1: CDA)	\$105
g.	Total Estimated Off-Site Incineration Costs (4a x 4f)	\$36,002
h.	TOTAL ESTIMATED OFF-SITE MANAGEMENT COSTS [4e + 4g]:	\$37,591

Table B.1 (CMF-1)

5. ON-SITE TREATMENT/DISPOSAL OF CONTAINER MANAGEMENT FACILITY "OTHER" INVENTORY, DRAIN AND FLUSH BUILDING WAREHOUSE ONE AND BULK SOLIDS STORAGE AREA		
a.	Quantity of containers to be treated on-site by stabilization prior to disposal: (0.40 x 1b)	1104.8
b.	Unit cost of stabilization followed by landfill disposal, \$/Container (See Table C.1: CDA):	\$61.00
c.	Total estimated cost for on-site treatment (stabilization) of container inventory: (5a x 5b)	\$67,393
d.	Quantity of containers designated for direct landfill disposal: (0.60 x 1b) = number of containers	1657.2
e.	Unit cost for direct landfill disposal of containers, \$/Container (See Table C.2: CDA):	\$4.66
f.	Total estimated cost for direct landfill disposal of container inventory: (5d x 5e)	\$7,719
g.	Unit cost of bulk inventory stabilization/treatment, \$/Cubic Yard (See Table C.1: CDA):	\$125
h.	Unit cost of bulk inventory direct landfill disposal, \$/Cubic Yard (See Table C.2: CDA):	\$17.09
i.	Estimated cost of stabilization/treatment of bulk solids: (BSSA) (1c x 5g)	\$250,000
j.	Estimated cost of landfill disposal of bulk solids after treatment: (BSSA) (1d x 5h)	\$54,701
k.	TOTAL ESTIMATED COST OF ON-SITE MANAGEMENT (5c + 5f + 5i + 5j):	\$379,813
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 A, Square Feet (See Table C.3: CDA):	50,976
d.	Total estimated volume for disposal, Cubic Yards (See Table C.3: CDA):	2,377
e.	Unit cost for direct landfill disposal, \$/Cubic Yard (See Table C.2: CDA):	\$17.09
f.	TOTAL ESTIMATED COST FOR ON-SITE MANAGEMENT (6c + 6d):	\$40,625
7. TOTAL LANDFILL CAPACITY ASSURANCE REQUIRED		
a.	Treated container inventory "on-site disposal" volume estimate: (See Table C.2: CDA - Gallons to Cubic Yards) $\{[(5a \times 1.6) + 5d] \times 0.27\}$	925
b.	Untreated container inventory "on-site disposal" volume estimate: (See Table C.2: CDA for cubic yard conversion) (Containers) (5d) 1381 containers x 26 cubic feet/container/27 = cubic yards required for untreated containerized waste	1,596
c.	Treated bulk inventory "on-site disposal" volume estimate: (See Table C.2: CDA for Landfill Capacity Assurance) (Cubic Yards) (1d)	3,200
d.	Untreated surface impoundment "on-site disposal" volume estimate: (See Table C.2: CDA for Landfill Capacity Assurance) (Cubic Yards) (6c)	2,377
e.	TOTAL LANDFILL CAPACITY ASSURANCE REQUIRED (Cubic Yards) [7a + 7b + 7c + 7d]:	8,098

**Table B.2: Worksheet CMF-2
Facility Decontamination**

1. PROTECTIVE AND SAFETY EQUIPMENT FOR PERSONNEL		
a.	Number of personnel requiring safety equipment for decontamination: (See Table C.3: CDA)	34
b.	Equipment cost, \$/person: (See Table C.3: CDA)	\$342.38
c.	TOTAL COST OF PERSONNEL SAFETY EQUIPMENT (1a x 1b):	\$11,641
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, Square Feet: (See Table C.3: CDA)	46,511
b.	Structure decontamination unit cost-initial wash-down, \$/Square Feet: (See Table C.3: CDA)	\$2.60
c.	Structure decontamination unit cost-final wash-down, \$/Square Feet: (See Table C.3: CDA)	\$0.90
d.	TOTAL CONTAINER MOBILIZATION COST [(3ax3b)+(3a x 3c):	\$162,607
4. ON-SITE TREATMENT/DISPOSAL OF DECONTAMINATION RESIDUALS		
a.	Residual generation rate for initial wash-down of container management facility, Gallons/Square Feet (See Table C.3: CDA)	1.625
b.	Residual generation rate for final wash-down of container management facility, Gallons/Square Feet (See Table C.3: CDA)	1.0
c.	Quantity of aqueous residuals to be treated: (Gallons) [(4a + 4b) x 3a]	120,929
d.	Unit cost of for aqueous treatment and discharge: (See Table C.3: CDA)	\$1.83
e.	Estimated cost of aqueous residual treatment: (4c x 4d)	\$221,107.00
f.	Quantity of solid residuals from decontamination to be stabilized, Cubic Yards (See Table C.3: CDA)	19
g.	Unit cost of stabilization, \$/Cubic Yard: (See Table C.1: CDA)	\$125
h.	Estimated cost of solids residual treatment: (4f x 4g)	\$2,362
i.	Unit cost of on-site landfill disposal of bulk solids, \$/Cubic Yard: (See Table C.2: CDA)	\$17.09
j.	Estimated volume of treated residuals, Cubic Yards. (4f x 1.6)	30.2
k.	Estimated cost of on-site landfill disposal of bulk solids: (4i x 4j)	\$516
l.	Quantity of soils to be removed adjacent to container management facility, Cubic Yards: (See Table C.3: CDA)	80
m.	Unit cost of soils removal, \$/Cubic Yard: (See Table C.3: CDA)	\$2.28
n.	Estimated cost of landfill disposal of soils: [4l x (4i + 4m)]	\$1,550

Table B.2 (CMF-2)

o.	TOTAL COST OF ON-SITE TREATMENT/DISPOSAL OF DECONTAMINATION RESIDUALS: (4e + 4h + 4k + 4n)	\$225,535
p.	Decontamination residuals “on-site disposal” volume estimate, Cubic Yards: (See Table D.2: CDA for Landfill Capacity Assurance) (4l + 4j)	110
q.	TOTAL LANDFILL CAPACITY ASSURANCE REQUIRED (Cubic Yards) [4p]:	110

**Table B.3: Worksheet CMF-3
Ancillary Closure Activities**

1. SITE REGRADING		
a.	Quantity of soils for regrading to compensate for removals, Cubic Yards (See Table C.3: CDA)	80
b.	Cost of hauling, regrading and miscellaneous requirements, \$/Cubic Yard (See Table C.3: CDA)	\$6.18
c.	Total cost of site regrading: (1a x 1b)	\$495
2. SUMP TESTING		
a.	Number of sumps within container management facility:	5
b.	Unit cost of hydrostatic testing of sumps, \$/Sump (See Table C.5: CDA)	\$260.62
c.	Total cost of hydrostatic testing of sumps, \$/Sump. (2a x 2b)	\$1,303.08
d.	TOTAL COST OF ANCILLARY CLOSURE ACTIVITIES (1c + 2c):	\$1,798

**Table B.4: Worksheet CMF-4
Closure Certification**

1 SAMPLING AND ANALYSIS TO CONFIRM DECONTAMINATION		
a.	Number of samples for confirmation of "clean" wash water: (See Table C.6: CDA)	6
b.	Unit cost of liquid analysis, \$/Sample: (See Table C.6: CDA)	\$1,556
c.	Total cost of liquid sample analysis for decontamination confirmation: (1a x 1b)	\$9,335
d.	Number of samples for soil decontamination confirmation: (See Table C.6: CDA)	20
e.	Unit cost of soil/sludge analysis: (See C.6: CDA) (\$/Sample)	\$1,630
f.	Cost of soil/sludge sample analysis for decontamination confirmation: (1e x 1d)	\$32,601
g.	Number PCB samples for liquid analysis: (See Table C.6: CDA)	10
h.	Unit cost of liquid samples for PCB analysis: (See Table C.6: CDA) (\$/Sample)	\$105
i.	Cost of liquid sample analysis for decontamination confirmation: (1g x 1h)	\$1,053
j.	Number PCB samples for soil analysis: (See Table C.6: CDA)	55
k.	Unit cost of soil samples for PCB analysis: (See Table C.6: CDA) (\$/Sample)	\$105
l.	Cost of liquid sample analysis for decontamination confirmation: (1g x 1h)	\$5,790
m.	TOTAL ESTIMATED ANALYTICAL COSTS FOR CMF CLOSURE (1c +1f + 1i + 1l):	\$48,779
2. CERTIFICATION DOCUMENTS BY INDEPENDENT PROFESSIONAL ENGINEER		
a.	Certification documents by independent Professional Engineer: (See Table C.6: CDA)	\$112,348
m.	TOTAL CERTIFICATION COSTS BY INDEPENDENT PE (2a):	\$112,348

Table B.5

Table B.5: Container Management Facility, DFBWO and BSSA Closure Cost Estimate

CONTAINER MANAGEMENT FACILITY AND BSSA CLOSURE COST ESTIMATE		
Re-Containerization of Waste	(Table B.1)	\$30,903
Container Mobilization	(Table B.1)	\$23,067
Off-Site Management of Inventory	(Table B.1)	\$37,591
On-Site Treatment/Disposal of Container Management Facility "other" Inventory, Drain and Flush Building Warehouse One and Bulk Solids Storage Area	(Table B.1)	\$379,813
Surface Impoundment Solids Management	(Table B.1)	\$40,625
Protective and Safety Equipment for Personnel	(Table B.2)	\$11,641
Container Management Facility Structure Decontamination	(Table B.2)	\$162,607
On-Site Treatment/Disposal of Decontamination Residuals	(Table B.2)	\$225,535
Ancillary Closure Activities	(Table B.3)	\$1,798
Sampling Analysis to Confirm Decontamination	(Table B.4)	\$48,779
Closure Certification Documents by Independent Professional Engineer	(Table B.4)	\$112,348
SUBTOTAL ESTIMATED CMF & BSSA CLOSURE COST:		\$1,074,706
Administrative and Contingency Costs (10%)		\$107,471
TOTAL ESTIMATED (2022 \$'s) OF CMF AND BSSA CLOSURE COSTS:		\$1,182,176

Table B.6: 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, Gallons: (See Table D.1)	17,000
3. PUT-PILE INVENTORY		
a.	Assumed inventory of put piles: (See Table C.2: CDA)	80
b.	Average unit cost to analyze: (See Table C.2: CDA)	\$87
c.	Total cost to initially analyze put piles: (See CDA) (3a x 3b)	\$6,960
d.	Average failure rate of put pile treatment, Fraction of Piles: (See Table C.2: CDA)	0.2
e.	Number of put piles that must be retreated: (3a x 3d)	16.0
f.	Volume expansion factor due to retreatment, Factor: (See Table C.2: CDA)	1.3
g.	Average size of each put pile, Cubic Yards: (See Table C.2: CDA)	45
h.	Total Yards Requiring Retreatment: (Cubic Yards) (3e x 3f x 3g)	936
i.	Unit cost to retreat, analyze and move put piles, \$/Cubic Yard: (See Table C.2: CDA)	\$166
j.	Total cost to retreat failed put piles: (3h x 3i)	\$155,582
k.	Unit cost to move failed put piles, \$/Cubic Yard: (See Table C.2: CDA)	\$2.54
l.	Total cost to move failed put piles: (3h x 3k)	\$2,381
m.	Cost to re-analyze re-treated put piles: (3e x 3b)	\$1,392
n.	TOTAL COST TO INITIALLY ANALYZE, RETREAT, MOVE PUT PILES (\$) (3c + 3j + 3l + 3m):	\$166,315
o.	Put-pile volume estimate, treatment successful on first time, Cubic Yards: (See Table C.2: CDA for Landfill Capacity Assurance) [3a x 3g x (1-3d)]	2880
p.	Put-pile volume estimate, treatment not successful on first time, Cubic Yards: (See Table C.2: CDA for Landfill Capacity Assurance) [3h x 1.3]	1217
q.	TOTAL LANDFILL CAPACITY ASSURANCE REQUIRED (Cubic Yards) [3o + 3p]:	4,097
4. LEACHATE INVENTORY MANAGEMENT		
a.	Hazardous waste inventory for treatment, Gallons: (2a)	17,000

Table B.6 (CLO-1)

b.	Unit cost of bulk liquid treatment \$/Gallon: (See Table C.3: CDA)	\$1.83
c.	TOTAL ESTIMATED OFF-SITE MANAGEMENT COSTS (4a x 4b):	\$31,083
	TOTAL ESTIMATED INVENTORY MANAGEMENT (3n + 4c):	\$197,398

**Table B.7: 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 Table C.3: CDA)	34
b.	Initial equipment cost per person: (See Table C.3: CDA)	\$342
c.	Total initial equipment cost: (1a x 1b)	\$11,628
d.	Renewing equipment cost per person per day: (See Table C.3: CDA)	\$20
e.	Number of closure days: (See Table C.3: CDA)	416
f.	Total renewing equipment cost: (1a x 1d x 1e)	\$278,920
g.	TOTAL COST OF PERSONNEL SAFETY EQUIPMENT [1c + 1f]:	\$290,548
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, Square Feet: (See Table C.3: CDA)	7,825
b.	Tank and equipment area to be decontaminated, Square Feet: (See Table C.3: CDA)	6,480
c.	Total HWMU area to be decontaminated: (3a + 3b)	14,305
d.	Unit cost for initial decontamination wash-down, \$/Square Foot: (See Table C.3: CDA)	\$2.60
e.	Unit cost for final decontamination wash-down, \$/Square Foot: (See Table C.3: CDA)	\$0.90
f.	Total cost for stabilization tank system decontamination: [3c x (3d + 3e)]	\$50,012
g.	Number PCB samples for liquid analysis: (See Table C.6:CDA)	5
h.	Unit cost of liquid samples for PCB analysis, \$/Sample: (See Table C.6: CDA)	\$105
i.	Total cost of liquid sample analysis for decontamination confirmation: (3g x 3h)	\$526
j.	Number PCB samples for soil analysis: (See Table C.6: CDA)	20
k.	Unit cost of soil samples for PCB analysis, \$/Sample: (See Table C.6: CDA)	\$105
l.	Total cost of liquid sample analysis for decontamination confirmation: (3j x 3k)	\$2,105
m.	Dismantling/demolition costs for one stabilization tank assuming it leaked: (See Table C.3: CDA)	\$7,498
n.	Number of stabilization tanks to be dismantled: (See Table C.3)	3

Table B.7 (CLO-2)

o.	Total cost for dismantling/demolition of stabilization tanks: (3m x 3n)	\$22,493
p.	TOTAL HWMU DECONTAMINATION COST [3f + 3i + 3l + 3o]:	\$75,136

Table B.7 (CLO-2)

4. LEACHATE TREATMENT TANK SYSTEM		
a.	Tank and equipment area to be decontaminated, Square Feet: (See Table C.3: CDA)	7,035
b.	Unit cost for initial decontamination wash-down, \$/Square Foot: (See Table C.3: CDA)	\$2.60
c.	Unit cost for final decontamination wash-down, \$/Square Foot: (See Table C.3: CDA)	\$0.90
d.	Total cost for leachate tank system decontamination: [4a x (4b + 4c)]	\$24,595
e.	Number of PCB Samples for liquid analysis: See Table C.6: CDA)	5
f.	Unit cost of liquid samples for PCB analysis, \$/Sample: (See Table C.6: CDA)	\$105
g.	Cost of liquid sample analysis for decontamination confirmation: (4e x 4f)	\$526
h.	Number of PCB samples for soil analysis: (See Table C.6: CDA)	20
i.	Unit cost of soil samples for PCB analysis, \$/Sample: (See Table C.6: CDA)	\$105
j.	Cost of liquid sample analysis for decontamination confirmation: (4h x 4i)	\$2,105
k.	TOTAL HWMU DECONTAMINATION COST [4d + 4g + 4j]:	\$27,227
5. SURFACE IMPOUNDMENT UNITS		
a.	Containment liner area to be decontaminated, Square Feet: (See Table C.3-CDA)	50,976
b.	Unit cost for initial decontamination wash-down, \$/Square Foot: (See Table C.3: CDA)	\$2.60
c.	Total wash-down decontamination: (5a x 5b)	\$132,338
d.	Quantity of liner and leak detection media removal, Cubic Yards: (See Table C.3: CDA – Landfill Capacity Assurance)	821
e.	Unit cost for liner components removal, \$/Cubic Yard: (See Table C.3: CDA)	\$7.71
f.	Total cost of liner component removal: (5d x 5e)	\$6,330
g.	Quantity of clay liner for removal, Cubic Yards: (See Table C.3: CDA – Landfill Capacity Assurance)	1,556
h.	Unit cost of clay liner removal, \$/Cubic Yard: (See Table C.3: CDA)	\$2.28
i.	Total cost of clay liner removal: (5g x 5h)	\$3,548
j.	TOTAL HWMU DECONTAMINATION COST (5c + 5f + 5i):	\$142,216
TOTAL FACILITY HWMU DECONTAMINATION COST (1g + 3p + 4k + 5fj):		\$535,127

Table B.8: Worksheet CLO-3
Treatment and Disposal of Decontamination Residuals

1. CONTAINER MANAGEMENT FACILITY		
a.	See CMF Closure Cost Worksheets	N/A
2. STABILIZATION TANK SYSTEM		
a.	Residual generation rate of initial decontamination wash-down of unit, Gallons/Square Foot: (See Table D.3: CDA)	1.63
b.	Residual generation rate of final decontamination wash-down of unit, Gallons/Square Foot: (See Table C.3: CDA)	0.98
c.	Quantity of residuals to be treated off-site, Gallons: [(2a + 2b) x 3c{from Table C.6}]	37,193
d.	Unit cost of management at treatment facility with NPDES permit, \$/Gallon: (See Table C.3: CDA)	\$1.83
e.	Quantity of solid residuals from decontamination, Gallons: (See Table D.3: CDA for solids generation rate of 0.05) (2c x Table D.3, C96)	1,860
f.	Total estimated cost of off-site transportation and management at treatment facility with NPDES: [(2c – 2e) x 2d]	\$64,603
g.	Quantity of decontamination residuals to be stabilized prior to disposal: (See Table C.2: CDA to convert from 55-gallon drums to cubic yards) (2e/55 x Table C.2, C6)	9
h.	Unit cost of bulk stabilization for residuals, \$/Cubic Yard: (See Table C.5: CDA)	\$166
i.	Total cost of stabilization for landfill disposal of residuals: (2g x 2h)	\$1,496
j.	Estimated solids volume of treated decontamination residuals, Cubic Yards: (See Table C.2: CDA for residual solids) [2g x Table C.2, C27]	12
k.	Unit cost of on-site landfill disposal of bulk solids, \$/Cubic Yard: (See Table C.2: CDA)	\$17.09
l.	Total cost of on-site landfill disposal of stabilized residuals: (2j x 2k)	\$205
m.	Quantity of soils removed for area decontamination, Cubic Yards: (See Table C.3: CDA – Landfill Capacity Assurance)	70
n.	Unit cost of soils removal, \$/Cubic Yard: (See Table C.3: CDA)	\$2.28
o.	Total cost of soils removal: (2m x 2n)	\$160
p.	Total cost of on-site disposal of soils residuals: (2m x 2k)	\$1,197
q.	TOTAL COST OF TREATMENT/DISPOSAL OF DECON RESIDUES (2f + 2i + 2l + 2o + 2p):	\$67,660
r.	Decontamination residuals “on-site disposal” volume estimate, Cubic Yards: (2j + 2m)	82
s.	TOTAL LANDFILL CAPACITY ASSURANCE REQUIRED (Cubic Yards) [2r]:	82

Table B.8 (CLO-3)

3. LEACHATE TANK SYSTEM		
a.	Residual generation rate of initial decontamination wash-down of unit, Gallons/Square Foot: (See Table D.3: CDA)	1.63
b.	Residual generation rate of final decontamination wash-down of unit, Gallons/Square Foot: (See Table C.3: CDA)	1.0
c.	Quantity of residuals to be treated, Gallons: [(3a + 3 b) x 4a{Table B.7}]	18,291
d.	Unit cost of off-site transportation and management at the Aragonite incinerator, \$/Gallon: (See Table C.8: CDA)	\$1.33
e.	Quantity of solid residuals from decontamination, Gallons: (See Table D.3: CDA for 0.05 factor) (3c x 0.05)	915
f.	Total estimated cost of off-site transportation and management at treatment facility with NPDES: [(3c – 3e) x 3d]	\$23,106
g.	Quantity of decontamination residuals to be stabilized prior to disposal: (See Table C.2: CDA to convert from 55-gallon drums to cubic yards) (3e/55 x 0.27)	4.5
h.	Unit cost of bulk stabilization for residuals, \$/Cubic Yard: (See Table C.5)	\$166
i.	Total cost of stabilization for landfill disposal of residuals: (3g x 3h)	\$748
j.	Estimated volume of treated decontamination residuals, Cubic Yards: (See Table C.3: CDA for conversion factor 1.6) (3g x 1.6)	7.3
k.	Unit cost of on-site landfill disposal of bulk solids, \$/Cubic Yard: (see Table C.2: CDA)	\$17.09
l.	Total cost of on-site landfill disposal of stabilized residuals: (3j x 3k)	\$125
m.	Quantity of soils removed for area decontamination, Cubic Yards: (See Table C.3: CDA – Landfill Capacity Assurance)	30
n.	Unit cost of soils removal, \$/Cubic Yard: (See Table D.3: CDA)	\$2.28
o.	Total cost of soils removal: (3m x 3n)	\$68
p.	Total cost of on-site landfill disposal of stabilized residuals: (3m x 3k)	\$513
q.	TOTAL COST OF TREATMENT/DISPOSAL OF DECON RESIDUALS (3f + 3i + 3l + 3o + 3p):	\$24,560
r.	Decontamination residuals “on-site disposal” volume estimate, Cubic Yards: (See CDA for Landfill Capacity Assurance) (3j + 3m)	37.3
s.	TOTAL LANDFILL CAPACITY ASSURANCE REQUIRED (Cubic Yards) [3 p]:	37.3

Table B.8 (CLO-3)

4. SURFACE IMPOUNDMENT UNIT A		
a.	Residual generation rate of initial decontamination wash-down of unit, Gallons/Square Foot: (See Table D.3 CDA)	1.6
b.	Quantity of aqueous residuals to be treated, Gallons: [(4a x 5a{Table B.7})]	82,836
c.	Unit cost of management at treatment facility with NPDES permit, \$/Gallon: (See Table C.3: CDA)	\$1.83
d.	Quantity of solid residuals from decontamination, Gallons: (See table C.3: CDA for solid residuals factor) (4b x 0.05)	4,142
e.	Total estimated cost of off-site transportation and management at treatment facility with NPDES: [(4b – 4d) x 4c]	\$143,885
f.	Quantity of decontamination residuals to be stabilized prior to disposal, Cubic Yards: (See Table C.2: CDA to convert from 55-gallon drums to cubic yards) (4d/55 x Table C.2, C6)	20
g.	Unit cost of bulk stabilization for residuals, \$/Cubic Yard: (See Table B.6: CDA)	\$166
h.	Total cost of stabilization for landfill disposal of residuals: (4f x 4g)	\$3,324
i.	Estimated volume of treated decontamination residuals, Cubic Yards: (See Table C.2: CDA – Landfill Capacity Assurance) [4d/55 x Table D.2,C6 x Table C.3,C33]	33
j.	Unit cost of on-site landfill disposal of bulk solids, \$/Cubic Yard: (See Table C.2: CDA)	\$17.09
k.	Total cost of on-site landfill disposal of stabilized residuals: (4i x 4j)	\$565
l.	Quantity of liner component and leak detection media removed, Cubic Yards: (See Table B.7) (5d {from CLO-2})	821
m.	Total cost of liner/leak detection media and land disposal: (4l x 4j)	\$14,026
n.	Quantity of clay liner/soils removed, Cubic Yards: (See Table B.7: CDA) (5g {from CLO-2})	1,556
o.	Total cost of clay liner land disposal: (4n x 4j)	\$26,598
	TOTAL COST OF TREATMENT/DISPOSAL OF DECON RESIDUALS [4e + 4h + 4k+ 4m + 4o]:	\$188,399
p.	Decontamination residuals “on-site disposal” volume estimate, Cubic Yards: (4i + 4l + 4n)	2,410
q.	TOTAL LANDFILL CAPACITY ASSURANCE REQUIRED (Cubic Yards) [4p]:	2,410
	TOTAL COST OF TREATMENT/DISPOSAL OF DECONTAMINATION RESIDUALS: [2q + 3q + 4q]	\$280,619

Table B.9: Worksheet CLO-4
Final Cover/Landfill Closure

1. FINAL COVER LANDFILL CLOSURE (BASED COSTS OF SIMILAR CLOSURE CAPS)		
a.	Cell B/6 (See Table C.10)	\$5,298,120
b.	Cell 7 (See Table C.11)	\$5,029,919
c.	Cell 8 (See Table C.9)	\$4,796,368
d.	TOTAL COST OF FINAL COVER/LANDFILL CLOSURE (1a + 1b + 1c):	\$15,124,407

**Table B.10: Worksheet CLO-5
Groundwater Monitoring During Closure Activities**

1. GROUNDWATER MONITORING - DETECTION MONITORING BACKGROUND & COMPLIANCE POINT		
a.	Number of Total Wells on Site	108
b.	Number of Wells Included in the Groundwater Monitoring Program	81
s.	Total cost for annual groundwater monitoring, sampling, reporting, maintenance: (See Table C.4: CDA)	\$161,629
t.	Number of years during closure	2
v.	Total Groundwater Monitoring and Maintenance Costs During Closure:	\$323,258

**Table B:11: Worksheet CLO-6
Ancillary Closure Activities**

1. LEACHATE MANAGEMENT		
a.	Leachate pumping and transfer from landfill cells, Average Gallons/Day: (See Table C.5: CDA)	548
b.	Number of Cells: (Includes RCRA Cells 1, 2, 3, 4, 5, 7, RCRA/TSCA Cells 8, B6, and Industrial Waste Cells 1 and 2)	10
c.	Closure period expected for final closure is 2 years, Days:	730
d.	Leachate volume total, Gallons: (1a x 1c)	400,356
e.	Unit cost of leachate pumping and transfer, \$/Gallon: (See Table C.5: CDA)	\$0.96
f.	Total cost of leachate pumping and transfer: (1d x 1e)	\$384,741
g.	Unit cost of off-site transportation and management at the Aragonite incinerator, \$/Gallon: (See See Table C.7: CDA)	\$2.06
h.	Quantity of solid residuals Gallons: (See Table C.3: CDA for solid residuals factor) (1d x Table C.3, C92)	20,018
i.	Total estimated cost of off-site transportation and management at treatment facility: [(1d – 1h) x 1g]	\$782,881
j.	Quantity of leachate management residuals to be stabilized prior to disposal, Cubic Yards: (See Table C.2: CDA to convert from 55-gallon drums to cubic yards) (1h/55 x Table C.2, C6)	98
k.	Unit cost of bulk stabilization for landfill disposal of treated leachate residuals, \$/Cubic Yard: (See Table B.8)	\$166
l.	Total cost of stabilization of leachate residuals: (1j x 1k)	\$16,290
m.	Estimated volume of treated residuals, Cubic Yards: (See C.1: CDA for treated residuals volume factor) ((1j x Table C.1, C29)	157
n.	Unit cost of on-site landfill disposal of bulk solids, \$/Cubic Yard: (See Table C.2: CDA)	\$17.09
o.	Total cost of on-site landfill disposal of stabilized residuals: (1m x 1n)	\$2,680
p.	TOTAL COST OF LEACHATE MANAGEMENT [1f + 1i + 1l + 1o]:	\$1,186,592
2. RUN-ON/RUN-OFF CONTROL MAINTENANCE		
a.	Unit cost of maintenance crew, \$/Day: (See Table C.5: CDA)	\$3,072
b.	Estimated days of maintenance during 24 months of closure: (See C.5 CDA)	24
c.	TOTAL COST OF RUN-ON/RUN-OFF CONTROL MAINTENANCE (2a x 2b):	\$73,718
3. SECURITY/INSPECTION		
a.	Personnel required for security during closure, Hours/Day: (See Table C.5: CDA)	24
b.	Duration of period requiring security during closure, Days: (See Table C.5: CDA)	365
c.	Unit cost of personnel for security, \$/Hour: (See Table C.5: CDA)	\$60
d.	Fraction of security associated with RCRA closure: (See Table C.5: CDA)	0.77
e.	TOTAL COST OF SECURITY DURING CLOSURE (3a x 3b x 3c x 3d):	\$404,308
4. MOBILIZATION/DEMOBILIZATION OF HEAVY EQUIPMENT		

Table B.11 (CLO-6)

a.	Mobilization/demobilization of six heavy pieces of equipment (see Table C.5: CDA)	\$32,948
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Table B.11 (CLO-6)

5. SITE REGRADING/RESTORATION		
a.	Volume of soil disturbance for decontamination, Cubic Yards: (See Table C.5: CDA)	200
b.	Quantity of fill material (on-site) for regrading, Cubic Yards: (See Table C.5: CDA)	200
c.	Unit cost of fill material for regrading – excavation and haul, \$/Cubic Yard: (See Table C.3: CDA)	\$5.52
d.	Total cost of fill material: (5a x 5c)	\$1,105
e.	Quantity of other site regrading, Cubic Yards: (See Table C.3: CDA)	1,556
f.	Unit cost of site regrading, \$/Cubic Yard: (See Table C.3: CDA)	\$0.66
g.	Total cost of regrading: [(5b + 5e) x 5f]	\$1,160
h.	TOTAL COST OF SITE RESTORATION (5d + 5g):	\$2,265
6. SUMP TESTING		
a.	Number of sumps affected: (See Table C.5: CDA)	40
b.	Unit cost of sump testing, \$/Sump: (See Table C.5: CDA)	\$261
c.	TOTAL COST OF SUMP TESTING (6a x 6b):	\$10,425
7. EQUIPMENT DECONTAMINATION (GENERAL)		
a.	Number of units of equipment to be decontaminated: (See See Table C.5: CDA)	42
b.	Unit cost of decontamination, \$/Unit: (See Table C.5: CDA)	\$194
c.	Total cost of miscellaneous equipment decontamination: (7a x 7b)	\$8,145
d.	Decontamination residual generation rate, Gallons/Unit: (See Table C.5: CDA)	1,300
e.	Total decontamination residual generated, Gallons: (7a x 7d)	54,600
f.	Unit cost of management at treatment facility with NPDES permit, \$/Gallon: (See Table C.3: CDA)	\$1.83
g.	Total estimated cost of off-site transportation and management at treatment facility: [(7e - 7h) x 7f]	\$94,840
h.	Quantity of solid residuals from decontamination, Gallons: (See CDA) (7e x Table C.3, C92)	2,730
i.	Quantity of decontamination residuals to be stabilized prior to disposal, Cubic Yards: (See Table C.2: CDA to convert from 55-gallon drums to cubic yards) (7h/55 x Table C.2, C6)	13.4
j.	Unit cost of bulk stabilization for landfill disposal of treated leachate residuals, \$/Cubic Yard: (See See Table C.1: CDA)	\$125
k.	Total cost of stabilization of leachate residuals: (7i x 7j)	\$1,675
l.	Estimated volume of treated decontamination residual, Cubic Yards: (See Table C.2: CDA for conversion factors) [(7i x Table C.1, C29)]	21.44
m.	Unit cost of on-site landfill disposal of bulk solids, \$/Cubic Yard: (See Table C.2: CDA)	\$17.09
n.	Total cost of on-site landfill disposal of stabilized residuals: (7l x 7m)	\$367
o.	TOTAL COST OF EQUIPMENT DECONTAMINATION (7c + 7g + 7k + 7n):	\$105,026

Table B.11 (CLO-6)

8. TRUCK WASH STATION DECONTAMINATION		
a.	Number truck wash stations: (See Table C.5: CDA)	4
b.	Area of station for decontamination per station, Square Feet: (See Table C.5: CDA)	5,500
c.	Quantity of gravel/soils removal for decontamination per station, Cubic Yards: (See Table C.5: CDA)	237
d.	Unit cost for decontamination wash-down, \$/Square Foot: (See Table C.3: CDA)	\$2.60
e.	Unit cost for soils/gravel removal, \$/Cubic Yard: (See Table C.3: CDA)	\$2.28
f.	Total cost of decontamination: (8a x 8b x 8d) + (8a x 8c x 8f)	\$59,275
g.	Decontamination residual generation rate, Gallons/Square Foot: (See Table C.3: CDA)	1.625
h.	Total aqueous decontamination residual generated, Gallons: (8a x 8b x 8g)	35,750
i.	Unit cost of management at treatment facility with NPDES permit, \$/Gallon: (See Table C.3: CDA)	\$1.83
j.	Quantity of solid residuals from decontamination, Gallons: (See Table C.3: CDA for solid residuals factor) (8h x Table C.3, C92)	1,788
k.	Total estimated cost of off-site transportation and management at treatment facility: [(8h – 8j) x 8i]	\$62,097
l.	Quantity of decontamination residuals to be stabilized prior to disposal, Cubic Yards: (See See Table C.2: CDA to convert from 55-gallon drums to cubic yards) (8j/55 x Table C.2, C6)	8.8
m.	Unit cost of bulk stabilization of residuals, \$/Cubic Yard: (See Table D.1: CDA)	\$125
n.	Total cost of stabilization of residuals: (8l x 8m)	\$1,097
o.	Estimated volume of treated decontamination residuals, Cubic Yards: (See Table D.1: CDA for volume factor from treated residuals) [(8l x Table C.1, C29)]	14.0
p.	Unit cost of on-site landfill disposal of stabilized residuals, \$/Cubic Yard: (See Table C.2: CDA)	\$17.09
q.	Total cost of on-site landfill disposal of stabilized residuals: (8o x 8p)	\$240
r.	Quantity of fill material needed on-site for regrading of truck wash, Cubic Yards: (8a x 8c)	948
s.	Unit cost of fill material for regrading, excavation, haul, \$/Cubic Yard: (See Table C.3: CDA)	\$5.52
t.	Total cost of fill material: (8r x 8s)	\$5,236
u.	Unit cost of site regrading, \$/Cubic Yard: (See Table C.3: CDA)	\$0.66
v.	Total cost of regrading: (8r x 8u)	\$626
w.	TOTAL COST OF TRUCK WASH DECONTAMINATION/RESTORATION (8f + 8k + 8n + 8q + 8t + 8v):	\$128,572
9. TOTALS FOR ANCILLARY CLOSURE ACTIVITIES		
a.	TOTAL COST OF ANCILLARY CLOSURE ACTIVITIES [1p + 2c + 3e + 4a + 5h + 6c + 7o + 8w]:	\$1,943,854
b.	TOTAL DECONTAMINATION RESIDUE FROM ANCILLARY CLOSURE ACTIVITIES (1m + 5a + 7l + 8c x 8a + 8o) in cubic yards	1,340.3

**Table C.1: Cost Documentation (CDA)
Inventory Management**

INVENTORY MANAGEMENT		
General Management Practices		
Re-Containerization of Waste Stream (2018 RS Means, Inflation Adjusted)		
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	\$321.91
Fraction of Total Number of Drums	Fraction	0.03
Container Mobilization (Source: 2018 RS Means Heavy Construction Costs, Inflation Adjusted)		
Forklift Rental & Operating Cost	\$/Workday	\$248.04
Equipment Operator	\$/Hour	\$76.29
Laborer	\$/Hour	\$59.86
Operated Unit Cost	\$/Day	\$1,337.23
Operated Unit Cost	\$/Pallet	\$33.43
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 for incineration has been assumed.	Fraction	0.10
Transportation Cost: Truck, Van, and Driver Unit Cost (Clean Harbors, Inflation Adjusted)	\$/Full Vanload	\$317.64
Number of Drums per Load	Drums/Load	40
Transportation Costs-: Unit cost of full van load shipments to Aragonite, Utah.	\$/Drum	\$7.94
Incineration Costs. (Clean Harbors 2018, Inflation Adjusted)	\$/Drum	\$105.27
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. (Clean Harbors 2022)		
Container Cost	\$/Drum	\$61

Table C.1 (CDA) Inv Mgmt

Bulk Cost	\$/Yd ³	\$125
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Table C.1 (CDA) Inv Mgmt

Direct Landfill Disposal		
<p>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.</p>	<p>Fraction to not be stabilized.</p>	<p>0.60</p>
<p>In order to more accurately assess the cost of landfill disposal, the waste streams treated by stabilization, it 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.</p>	<p>Stabilization Volume Factor</p>	<p>1.6</p>

**Table C.2: Cost Documentation (CDA)
Landfill Capacity Assurance**

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/Ft ³	7.48
Cubic Yards to Cubic Feet	Ft ³ /Yd ³	27.00
Containerized inventory for direct landfill	See CMF.1	
Containerized inventory stabilized then landfill disposed.	See CMF.1	
Landfill Capacity Assurance Waste Inventory Total Volume	See CMF.1	
Landfill Disposal Costs		
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 (2022 Clean Harbors)	\$/ton or Yd ³	\$2.54
Amortized cost of airspace (Cell 8, 2022 Clean Harbors)	\$/Yd ³	\$14.55
Unit Landfill Disposal Cost (Bulk)	\$/Yd ³	\$17.09
Unstabilized load of drums	Drums/Yd ³	3.67
Stabilized load of drums	Drums/Yd ³	2.3
Unit Landfill Disposal Cost (Per Unstabilized Drums)	\$/Unstab. Drum	\$4.66
Unit Landfill Disposal Cost (Per Number of Drums to be Stabilized)	\$/3 Stab. Drum	\$7.43
Put-Pile Disposal Costs (Source: Grassy Mountain, Inflation Adjusted)		
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 permit allows for a maximum of 250 put-piles. Only 40 put-piles are generally in place at one time. A conservative estimate of 80 put-piles is assumed for closure cost estimating. The following additional assumptions are used to develop the costs for those that have to be treated.		
Maximum number of put-piles	Number	80
Average put-pile size (Estimate from Grassy Mountain Facility)	Yd ³	45
Fraction of put-piles that must be retreated (Grassy Mountain Facility)	Fraction	0.2
Average analysis cost (2022 Clean Harbors)	\$/Pile	\$87.00
Volume increase as a result of stabilization	Factor	1.3
Operating labor, equipment, fuels	\$/ton or Yd ³	\$2.54
Stabilization costs (includes analytical, transportation, analytical review, profit margin) (2022 Clean Harbors)	\$/Yd ³	\$166.22
Total Re-Stabilization Costs	\$/Yd ³	\$168.76

**Table C.3: Cost Documentation (CDA)
Hazardous Waste Management Unit (HWMU)
Decontamination and Disposal of Decontamination Residues**

HAZARDOUS WASTE MANAGEMENT UNIT (HWMU) DECONTAMINATION AND DISPOSAL OF DECONTAMINATION RESIDUES		
<p>For purposes of the Closure Cost Estimate decontamination of the hazardous waste management units and related structures is 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.</p>		
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 (Source: Clean Harbors 2022)		
Tyvek Suit	\$/Item	\$2.05
Chemical Resistant Boots	\$/Item	\$80.15
Nitrile Gloves, HD Disposable	\$/Item	\$0.16
Goggles	\$/Item	\$2.88
Full-Face Respirator	\$/Item	\$143.93
Respirator Cartridges	\$/item	\$16.39
Hard Hat	\$/Item	\$17.81
30% Surcharge for Disposable Equipment During Closure	\$/Item	\$79.01
Total Initial Cost:	\$/Person	\$342.38
Protective Clothing, Disposable Items	Item/Day/Person	1
Tyvek Suit	\$/Item	\$2.05
Nitrile Gloves (8 pair/day Disposable)	\$/Item	\$1.28
Cartidges	\$/Item	\$16.39
Total Renewing Cost	\$/Item	\$19.72
Closure Time	Years	2
	Hours/Year	2,080
	Hours/Day	10
	Days	416
Total Renewing Cost for Two Year Closure Period:	\$/Person	\$8,204

Table C.3 (CDA) HWMU

Overview of Decontamination Methods Assumed for Cost Estimating Purposes (Source: Americon 2001)		
High-pressure water wash systems provided in RS Means operated at 5 GPM and 7 GPM and at a pressure of 3000 psi (2018 RS Means pg. 546). Previous estimates used 5 GPM which is consistent with equipment provided in the RS Means, therefore, use 5 gallons per minute. Note: The following are crew production rates and residual production estimates were provided in previous closure estimates. Upon review of these rates of production, it is believed the rates previously listed should be conservative and reliable in determining costs to perform this work; therefore no change has been made to the production rates and estimates.		
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.	3.1
Spray unit residual generation	GPM	5
Residual generation rate	Gal./Sq. Ft.	1.625
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	5.1
Spray Unit Residual Generation	GPM	5
Residual Generation Rate	Gal./Sq. Ft.	0.975
Residual Generation Rate	Gal./Day	1,950
Crew/Equipment Overview (2018 RS Means, Inflation Adjusted)		
One Laborer Foreman	\$/hour	\$62.87
Four Laborers	\$/hour	\$239.46
One Pressure Washer (5 GPM @ 3000 psi)	\$/day	\$62.72
Tools, Accessories and Hoses (Estimated/Assumed)	\$/day	\$200.00
Portable Pump (Centrifugal gas @130 GPM)	\$/day	\$76.93
Cleaning Chemicals/Surfactants (source: cleanitsupply.com & zoro.com, mix ratio about 1:20 for about 100 gal, or 2 drums per day)	\$/day	\$1,012
	Total Washing Cost Per Shift	\$/shift \$1,654
	Total Rinsing Cost Per Shift	\$/Shift \$642
High-Pressure Washing		
Estimated production of the crew and equipment for the decontamination 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	0.3
Estimated cost for the labor and equipment portion of the decontamination wash.	\$/Sq. Ft.	\$1.79

Table C.3 (CDA) HWMU

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.		
Estimated production of the crew and equipment for the decontamination rinse.	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 and equipment portion of the decontamination rinse.	\$/Sq. Ft.	\$0.42
Wash/Rinse 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 (2018 RS Means, inflation adjusted).		
Tanker truck_4x2 220 HP, 10,000 gal. water tank, and driver	\$/Day	\$848.16
Water delivery	Gal.	10,000
Crew (One tanker truck and driver)	\$/Gal.	\$0.085
Water Cost (2017 FEMP Report - 2016 SLC Corp. Public Utilities, Inflation Adjusted)	\$/Gal.	\$0.002
Water Cost Including Transportation	\$/Gal.	\$0.087
Water Cost	\$/Day	\$173.07
Wash Water	\$/Sq. Ft.	\$0.1406
Rinse Water	\$/Sq. Ft.	\$0.0844
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 vacuum truck and driver (2018 RS Means, Inflation Adjusted)	\$/Day	\$797
Wash Water Storage	\$/Sq. Ft.	\$0.66
Rinse Water Storage	\$/Sq. Ft.	\$0.40
Total Cost of Water, Wash/Rinse and Temporary Storage		
Unit Cost – Initial High-Pressure Decontamination	\$/Sq. Ft.	\$2.60
Unit Cost – Final High-Pressure Decontamination	\$/Sq. Ft.	\$0.90
Aqueous Treatment of Residuals		
It is assumed that aqueous residuals would be treated and disposed of on site.		
Treatment facility costs (2018 Clean Harbors, Inflation Adjusted)	\$/Gal.	\$1.83
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 wash.	Days	39
Tanker cost for initial wash.	\$	\$32,874
Initial rinse cost per Square Foot.	\$/Sq. Ft.	\$0.71
Time required for final rinse.	Days	23
Tanker cost for final rinse.	\$	\$19,724
Final rinse cost per Square Foot.	\$/Sq. Ft.	\$0.42
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

Table C.3 (CDA) HWMU

Solids generation rate.	Gal.	3,779
Conversion, Gallons to Cubic Yards	Gal./Cubic Yard	0.0050
Solids generation rate [1 gallon = (1/(7.48 x 0.27)) = 0.005 Cubic Yards].	Yd ³	18.9
Rinse water generation.	Gal.	45,348
LCA (Clean Harbors Estimated Quantity)	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: (Clean Harbors Estimate)	Yd ³	80
Stabilization Tank System Decontamination (Quantity Estimates by Clean Harbors)		
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: 2022 Clean Harbors)		
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	\$4.66
Number of Feet to Cut	Feet	246
Crane Mobilization/Demobilization	\$/Each	\$1,600
Cost of Operated Hydraulic Crane	\$/Day	\$4,750
Crane Operating Days	Days	1
Unit Cost of Stabilization Tank Demolition	\$	\$7,498
Number of Tanks to Demolish/Dismantle	Count	3
Leachate Treatment Tank System (Quantity Estimates by Clean Harbors)		
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

Table C.3 (CDA) HWMU

Tank Interior (Two Tanks)	Sq. Ft.	3,021
Total =	Sq. Ft.	7,035
Soils Removal (LCA)	Yd ³	30
Surface Impoundment unit Decontamination/Dismantling		
<p>Cost estimate assumptions are that the Surface Impoundments 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.</p>		
Surface Impoundment A	Sq. Ft.	42,480
Surface Impoundment A Total Geosynthetic Quantity (2 geomembranes, 1 geonet)	Sq. Ft.	127,440
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.		
Surface Impoundment A	Sq. Ft.	8,496
Summary of the estimate quantities of material and areas of decontamination:		
Surface Impoundment A Geosynthetics Disposal Subtotal:	Sq. Ft.	50,976
<p>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 0.0149 cubic yards per 1 square foot of liner components will require landfill disposal (this provides a fluff factor of about 15 for (2) 60-mil geomembrane and (1) 200-mil geonet). 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.</p>		
Surface Impoundment A Synthetic Liner Volume Requiring Dismantling and Disposal	Yd ³	760
Surface Impoundment A Gravel Collection Media (Primary)	Yd ³	10
Surface Impoundment A Gravel Collection Media (Secondary)	Yd ³	51
Surface Impoundment A Clay Liner Component Volume	Yd ³	1,556
Subtotal (Landfill Capacity Assurance):	Yd ³	2,377
Geosynthetic Components Removal (Source: 2018 RS Means, Inflation Adjusted)		
<p>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.</p> <p>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. Previous time estimates to remove geomembrane and geonets are assumed in this estimate.</p>		
Time to Complete Work (about 10,000 square feet of impoundment area per day)	Days	4.2
Length of Work Day	Hours/Day	10

Table C.3 (CDA) HWMU

Laborer Unit Cost	\$/Hour	\$59.86
Laborers	Number	4
Total Laborers Unit Cost	\$/Hour	\$239.46
Total Laborers Unit Cost	\$/Day	\$2,395
Operators	Number	1
Operator Unit Cost	\$/Hour	\$79.88
Total Operators Unit Cost	\$/Hour	\$80
Total Operators Unit Cost	\$/Day	\$799
Pumps - Hoses, Slings and Supplies (assume 2 pumps)	\$/Day	\$156
One Track (Crawler) Loader, 1-3/4 CY to 2-1/4 CY, 130 HP	\$/Hour	\$96.65
One Track (Crawler) Loader, 1-3/4 CY to 2-1/4 CY, 130 HP	\$/Day	\$966.51
	Total (Unit Cost):	\$/Day
	Total (Unit Cost):	\$/Yd ³
Excavation of Potentially Contaminated Soils (Source: 2018 RS Means, Inflation Adjusted)		
Excavate material and load to haul vehicle. Haul vehicle cost is included in disposal cost.		
Front-End Loader 4WD, 3 CY With Operator (Loader, Operator)	\$/Hour	\$137
Front-End Loader 4WD, 3 CY with Operator (Average 3 Minutes/Load Average)	Yd ³ /Hour	60
Front-End Loader 4WD, 3 CY with Operator	\$/Yd ³	\$2.28
Site Regrading/Restoration (Source: 2018 RS Means, Inflation Adjusted)		
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.		
Borrow Soil Excavation (5 CY Loader) and Haul (12 cy truck, 15 mph, 15 min wait, 1.5 mi cycle)	\$/Yd ³	\$5.52
Site Regrading (rough open sites, assume 1 CY/SY)	\$/Yd ³	\$0.66
	Total (Unit Cost):	\$/Yd ³
		\$6.18

**Table C.4: Cost Documentation (CDA)
Groundwater Monitoring During Closure/Post-Closure**

GROUNDWATER MONITORING DURING CLOSURE/POST-CLOSURE		
<p>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 81 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 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.</p>		
Number of Total Wells on Site	Number	108
Number of Wells Included in the Groundwater Monitoring Program	Number	81
Annual Well Maintenance Costs (2021 Clean Harbors)	\$/Well	\$23.07
Annual Labor and Lab Costs (2021 Clean Harbors)	\$/Well	\$1,473.44
Annual Reporting Costs (2021 Clean Harbors)	\$/Well	\$491.22
Total Groundwater Monitoring Effort	\$/Year	\$159,137
Total Groundwater Monitoring and Maintenance Effort	\$/Year	\$161,629

**Table C.5: Cost Documentation (CDA)
Ancillary Closure Activities**

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. Leachate production volumes are based on data from 2021.		
Leachate generation volume is derived from historical experience (January 2021 through December 2021). 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.	Days/Year	365
IWC 1	Gal in 2016	0
	Avg. Gal./Day	0.00
IWC 2	Gal in 2016	0
	Avg. Gal./Day	0.00
RCRA Cell 1	Gal in 2016	0
	Avg. Gal./Day	0.00
RCRA Cell 2	Gal in 2016	0
	Avg. Gal./Day	0.00
RCRA Cell 3	Gal in 2016	0
	Avg. Gal./Day	0.00
RCRA Cell 4	Gal in 2016	4327
	Avg. Gal./Day	11.85
RCRA Cell 5	Gal in 2016	1880
	Avg. Gal./Day	5.15
RCRA Cell 7	Gal in 2016	53720
	Avg. Gal./Day	147.18
RCRA/TSCA Cell 8	Cell 7 Gal	23286
	Avg. Gal./Day	63.80
RCRA/TSCA Cell B6	Gal in 2016	116965
	Avg. Gal./Day	320.45
Total average leachate collected per day	Gal./Day	548
Total average leachate collected per week	Gal./Week	3,839
Leachate Collection and Storage - Truck, Tank, and Driver (RS Means, Inflation Adjusted)	\$/Day	\$922
Hours Operated Per Day	Hours/Day	10
Days Per Week Collection from Cells	Days/Week	4
Total	\$/Week	\$3,689
Unit Cost of Leachate Collection from Cells	\$/Gal.	\$0.96
Run-On/Run-Off Control Maintenance (Source: 2018 RS Means)		
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	\$59.86
2 Operators	\$/Hour	\$161.74
1 Articulating 4WD Loader (3-4-1/2 CY Bucket, Inflation Adjusted)	\$/Hour	\$70.84

Table C.5 (CDA) Anc Clos

1 Excavator Backhoe (1CY Bucket, Inflation Adjusted)	\$/Hour	\$91.50
Hourly Cost of Maintenance Crew and Equipment	\$/Hour	\$383.95
Unit Cost of Maintenance Crew (8 Hour Day)	\$/Day	\$3,072
Frequency of Maintenance	Days/Month	1

Table C.5 (CDA) Anc Clos

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 probability 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 (10 RCRA out of 13 Cells)	Fraction	0.77
Unit Cost of Personnel (Assume RS Means Laborer Rate, Inflation Adjusted)	\$/Hour	\$59.86
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.		
Unit Charges	\$/Round Trip	\$5,491
Number of Trips	Count	6
Closure Cost		\$32,948
Site Regrading (Source: 2018 RS Means)		
Includes replacement soils from on-site locations.		
Borrow Soil Excavation (\$1.74/CY-5 CY Loader) and Haul (\$3.25/CY-12 cy truck, 15 mph, 15 min wait, 1.5 mi cycle)	\$/Yd ³	\$5.52
Site Regrading (\$0.60/SY rough open sites, assume 1 CY/SY)	\$/Yd ³	\$0.66
Unit Cost	\$/Yd ³	\$6.18
Replacement Volumes (Soils removed from around containment areas).	Yd ³	200
Replacement Volume Surface Impoundment	Yd ³	1,556
Sump Testing (Hydrostatic)		
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 16 sump areas (8 in Cell B6, 4 in Cell 7, 4 in Cell 8) are attributed to the areas being closed as part of this site-wide closure. Each sump area has 3 sumps (including leak detection sumps) for a total of 40 sumps.		
Number of Sumps	Count	40
Unit Cost (2022 Hansen Allen & Luce Fee Schedule)	\$/Test	\$260.62
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./Unit	1,300

Table C.5 (CDA) Anc Clos

Unit Cost (Clean Harbors Estimated Cost)	\$/Sq. Ft.	\$0.39
Cost Per Unit of General Decontamination (2015 Clean Harbors, Inflation Adjusted)	\$/Unit	\$194
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
Total 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.		
Number of Truck Wash Stations	Count	4
Area to be Decontaminated (55 x 100 feet)	Sq. Ft.	5500
Soils Excavation From Ramps (20 x 40 feet x 4 ramps)	Sq. Ft.	3200
Depth of Soil Excavation	Feet	2
Volume of Excavated Soil	Yd ³	237

**Table C.6: Cost Documentation (CDA)
Closure Certification**

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 samples is based on 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 surface impoundment A 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: AWAL 2018 and 2018 RS Means, inflation adjusted). 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.		
Unit Labor Cost (Liquid Sample for PCB)	\$/Sample	\$0.00
Unit Analytical Cost (Liquid Sample for PCB)	\$/Sample	\$105
Unit Total Cost (Liquid Sample for PCB)	\$/Sample	\$105.27
Unit Labor Cost (Soil/Wipe Sample for PCB)	\$/Sample	\$22.16
Unit Analytical Cost (Soil/Wipe for PCB)	\$/Sample	\$83.11
Unit Total Cost (Soil/Wipe Sample for PCB)	\$/Sample	\$105.27
Unit Labor Cost (Liquid Sample)	\$/Sample	\$22.16
Unit Analytical Cost (Liquid Sample)	\$/Sample	\$1,533.65
Unit Total Cost (Liquid Sample)	\$/Sample	\$1,555.81
Unit Labor Cost (Soil/Solid Sample)	\$/Sample	\$22.16
Unit Analytical Cost (Soil/Solid Sample)	\$/Sample	\$1,607.89
Unit Total Cost (Soil/Solid Sample)	\$/Sample	\$1,630.05

Table C.6 (CDA) Clos Cert

Certification Documents by Independent Professional Engineer		
<p>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.</p>		
Professional Engineer (PE) (2022 Hansen Allen & Luce Fee Schedule)	\$/Hour	\$170.48
Engineering Support, ES (2022 Hansen Allen & Luce Fee Schedule)	\$/Hour	\$124.57
Engineer Staff Inspection (ESI) (2022 Hansen Allen & Luce Fee Schedule)	\$/Hour	\$98.50
Clerical Staff (CS) (2022 Hansen Allen & Luce Fee Schedule)	\$/Hour	\$69.05
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
	Hours/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	500
Clerical Staff (CS)	Hours/Week	15
Clerical Staff (CS)	Hours	150
It is expected that the inventory management and facility decontamination will take approximately 133 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	133

Table C.6 (CDA) Clos Cert

Site Wide Certification Summary		
Engineering Staff Inspection (ESI)	\$	\$88,650
Professional Engineer (PE-Certifying)	\$	\$34,096
Engineering Support (ES)	\$	\$62,285
Clerical Support (CS)	\$	\$10,358
Subtotal	\$	\$195,389
Miscellaneous Expenditures (Fraction of Total)	Fraction	0.15
Miscellaneous Expenditures	\$	\$29,308
Total Estimate	\$	\$224,697
CMF 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	\$	\$112,348
<p>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 D-2.</p>		

**Table C.7: Cost Documentation (CDA)
Post-Closure Cost Considerations**

POST-CLOSURE COST CONSIDERATIONS		
<p>Leachate Management System Maintenance 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.</p>		
Total number of RCRA and RCRA/TSCA leachate pumps including Industrial Waste Cells (IWC 1 {2}, IWC 2 [4], Cell 1 [1], Cell 2 [9], Cell 3 [18], Cell 4 [24], Cell 5 [12], Cell 7 [12], Cell 8 [8], Cell B/6 [24])	Count	114
Estimated RCRA Pumps Replaced Per Year	Count	19
2 Laborers for 3 Hours at \$54.02/hour(2018 RS Means, inflation adjusted)	\$	\$359
Pump Replacement Costs (2018 Quote by EPG Pumps, inflation adjusted)	\$	\$3,321
Single Pump Replacement Cost	\$	\$3,680
Estimated Annual Cost of RCRA/TSCA Leachate Pump Replacements:	\$/Year	\$69,925
<p>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 a constant rate. It is assumed that the two year closure period and the first two years of post closure will produce volumes of leachate equal to those recorded from open cells in 2021 since the waste mound in those cells is above top of embankment level. The third year of post closure through the post closure period will decrease at the rate assumed. RCRA Cells 4 and 5 were closed in 2010, therefore, they have been closed for 10 years beyond the 2 year post closure period and are assumed to reduce in leachate volume at the assumed constant rate. Assume Cell 7, Cell 8 and Cell B/6 will close in 5 years, therefore, 7 years at the current rate.</p>		
Leachate reduction rate (Years 3-10) (% Reduction Per Year)	%	12%
2021 Leachate Volumes (2022 Grassy Mountain)		
IWC1	Gal./Day	1.9
IWC2	Gal./Day	0.0
RCRA Cell 1	Gal./Day	0.0
RCRA Cell 2	Gal./Day	0.0
RCRA Cell 3	Gal./Day	0.0
RCRA Cell 4	Gal./Day	11.9
RCRA Cell 5	Gal./Day	5.2
RCRA Cell 7	Gal./Day	147.2
RCRA/TSCA Cell 8	Gal./Day	63.8
RCRA/TSCA Cell B/6	Gal./Day	320.5
Total Leachate Collected / Day	Gal./Day	550.4
Total Leachate Collected / Year	Gal./Year	200,882

Table C.7 (CDA) Post-Clos Csts

Estimated Total Annual Leachate Rates During Closure and Post Closure		
Year 1 Closure	Gal./Year	200053
Year 2 Closure	Gal./Year	199323
Year 3 Post-Closure	Gal./Year	198681
Year 4 Post-Closure	Gal./Year	198115
Year 5 Post-Closure	Gal./Year	174342
Year 6 Post-Closure	Gal./Year	153421
Year 7 Post-Closure	Gal./Year	135010
Year 8 Post-Closure	Gal./Year	118809
Year 9 Post-Closure	Gal./Year	104552
Year 10 Post-Closure	Gal./Year	92006
Year 11 Post-Closure	Gal./Year	80965
Year 12 Post-Closure	Gal./Year	71249
Year 13 Post-Closure	Gal./Year	62699
Year 14 Post-Closure	Gal./Year	55175
Year 15 Post-Closure	Gal./Year	48554
Year 16 Post-Closure	Gal./Year	42728
Year 17 Post-Closure	Gal./Year	37600
Year 18 Post-Closure	Gal./Year	33088
Year 19 Post-Closure	Gal./Year	29118
Year 20 Post-Closure	Gal./Year	25624
Year 21 Post-Closure	Gal./Year	22549
Year 22 Post-Closure	Gal./Year	19843
Year 23 Post-Closure	Gal./Year	17462
Year 24 Post-Closure	Gal./Year	15366
Year 25 Post-Closure	Gal./Year	13522
Year 26 Post-Closure	Gal./Year	11900
Year 28 Post-Closure	Gal./Year	10472
Year 28 Post-Closure	Gal./Year	9215
Year 29 Post-Closure	Gal./Year	8109
Year 30 Post-Closure	Gal./Year	7136

Table C.7 (CDA) Post-Clos Csts

Estimated Total Annual Leachate Costs during Closure and Post-Closure		
Estimated Leachate Collection and Disposal Cost (2018 Clean Harbors)	\$/Gal	\$1.33
Estimated Leachate Transportation and Treatment (Incineration) Cost at Aragonite Facility (2018 Clean Harbors for 55 gallon drums, inflation adjusted)	\$/Gal	\$2.06
Year 1 Closure	\$	\$266,020.47
Year 2 Closure	\$	\$265,050.02
Total Leachate Management Cost During Closure:	\$	\$531,070.49
Average Annual Leachate Management During Closure:	\$/Year	\$265,535.25
Year 3 Post-Closure	\$	\$264,196.02
Year 4 Post-Closure	\$	\$263,444.50
Year 5 Post-Closure	\$	\$231,831.16
Year 6 Post-Closure	\$	\$204,011.42
Year 7 Post-Closure	\$	\$179,530.05
Year 8 Post-Closure	\$	\$157,986.44
Year 9 Post-Closure	\$	\$139,028.07
Year 10 Post-Closure	\$	\$122,344.70
Year 11 Post-Closure	\$	\$107,663.34
Year 12 Post-Closure	\$	\$94,743.74
Year 13 Post-Closure	\$	\$83,374.49
Year 14 Post-Closure	\$	\$73,369.55
Year 15 Post-Closure	\$	\$64,565.20
Year 16 Post-Closure	\$	\$56,817.38
Year 17 Post-Closure	\$	\$49,999.29
Year 18 Post-Closure	\$	\$43,999.38
Year 19 Post-Closure	\$	\$38,719.45
Year 20 Post-Closure	\$	\$34,073.12
Year 21 Post-Closure	\$	\$29,984.34
Year 22 Post-Closure	\$	\$26,386.22
Year 23 Post-Closure	\$	\$23,219.88
Year 24 Post-Closure	\$	\$20,433.49
Year 25 Post-Closure	\$	\$17,981.47
Year 26 Post-Closure	\$	\$15,823.70
Year 28 Post-Closure	\$	\$13,924.85
Year 28 Post-Closure	\$	\$12,253.87
Year 29 Post-Closure	\$	\$10,783.41
Year 30 Post-Closure	\$	\$9,489.40
Total Post-Closure Leachate Management Cost:	\$	\$2,389,978
Average Annual Post-Closure Leachate Management Cost:	\$/Year	\$85,356

Table C.7 (CDA) Post-Clos Csts

CAP (Final Cover Run-Off Control) Maintenance		
<p>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 of crew days required annually for routine maintenance is base on the overall post-closure schedule.</p>		
Crew Days Per Year	Days/Year	8
Hourly Cost of Maintenance Crew (2018 RS Means, inflation adjusted)	\$/Crew	\$212
Length of Day	Hours	10
Daily cost of Maintenance Crew	\$/Crew Day	\$2,116
Estimated Annual Cost for Cap Maintenance:		\$/Year \$16,926
Routine Inspections		
<p>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.</p>		
Inspection Time	Hrs./Month	10
Unit Cost of Personnel (Laborer, 2018 RS Means, inflation adjusted)	\$/Hour	\$60
Estimate of Annual Cost of Routine Inspections:		\$/Year \$7,184

**Table C.8: Cost Documentation (CDA)
Annual Post-Closure Certification and Administration**

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		
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.		
Engineer Staff Inspection, ESI (2022 Hansen Allen & Luce Fee Schedule)	\$/Hour	\$98.50
ESI Post-Closure Inspection Time	Hours	180
Engineering Support, ES (2022 Hansen Allen & Luce Fee Schedule)	\$/Hour	\$124.57
ES Support Functions	Hours	90
Total ES Costs:	\$/Year	\$28,941
Professional Engineer, PE (2022 Hansen Allen & Luce Fee Schedule)	\$/Hour	\$170.48
PE	Hours	20
Total PE Costs:	\$/Year	\$3,410
Subtotal	\$/Year	\$32,351
Miscellaneous Expenditures (Fraction of Subtotal)	Fraction	0.15
Miscellaneous Expenditures	\$/Year	\$4,853
TOTAL FINAL POST-CLOSURE CERTIFICATION:	\$/Year	\$37,204
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	\$170
Total PE	\$/Unit	\$5,114
Miscellaneous Expenditures (Fraction of Subtotal)	Fraction	0.4
Miscellaneous Expenditures	\$/Unit	\$2,046
Total unit Cost of Post-Closure Certification	\$/Unit	\$7,160
Number of Post-Closure units	Count	8
Estimated Total Cost of HWMU Post-Closure Certification	\$	\$57,281
Administrative and Contingency Fraction	Fraction	0.10
Contingency for Potential RFI's / Corrective Action Fraction	Fraction	0.10
Length of Post-Closure	Years	30

**Table C.9: Cost Documentation (CDA)
RCRA/TSCA Cell 8 Closure Cost Estimate**

BID ITEM	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	Total Cost
EARTHWORK					
1	MOBILIZATION AND DEMOBILIZATION	1	LS	\$ 219,870.00	\$ 219,870.00
2	PERFORMANCE AND PAYMENT BONDS	1	LS	\$ 36,645.00	\$ 36,645.00
3	REMOVE DEBRIS FENCE AROUND TOP PERIMETER OF CELL 7	1	LS	\$ 7,381.35	\$ 7,381.35
4	GRADE 1.5H:1V SLOPES AROUND WASTE PERIMETER AND RAMP AREAS AND FINE GRADE WASTE AS NEEDED	1	LS	\$ 78,237.08	\$ 78,237.08
5	REMOVE SOUTHWEST RAMP AND PROPERLY DISPOSE OF MATERIAL	1	LS	\$ 8,658.69	\$ 8,658.69
6	REMOVE MIDDLE NORTH RAMP AND PROPERLY DISPOSE OF MATERIAL	1	LS	\$ 8,658.69	\$ 8,658.69
7	MINE, PROCESS, AND STOCKPILE CLAY LINER MATERIAL (FROM MUD FLAT BORROW AREA)	34190	CY	\$ 22.73	\$ 777,158.46
8	OBTAIN (MINE, PURCHASE, BORROW, ETC.), HAUL, AND PLACE GCL COMPATIBLE 6-INCH SOIL LAYER (FROM NEAREST COMPLIANT BORROW AREA)	8116	CY	\$ 8.68	\$ 70,444.25
9	COMPACTED CLAY LINER PLACEMENT (PROCESSED CLAY FROM MUD FLAT BORROW AREA)	34190	CY	\$ 13.09	\$ 447,465.72
10	GEOMEMBRANE ANCHOR TRENCH EXCAVATION AND BACKFILL AROUND BASE OF CLOSURE CAP	3140	LF	\$ 6.81	\$ 21,367.23
11	COMPACTED CLAY SOIL AROUND PERIMETER SLOPES (FROM NEAREST COMPLIANT BORROW AREA)	15674	CY	\$ 15.97	\$ 250,266.65
12	COMPACTED CLAY SOIL FOR PERIMETER BERM AREA AROUND CLOSURE CAP (FROM NEAREST COMPLIANT BORROW AREA)	7612	CY	\$ 17.28	\$ 131,504.51
13	FURNISH AIR-GAS VENTS FOR INSTALLATION BY THE GEOSYNTHETICS INSTALLER (HDPE PIPE AND PLATE)	8	EA	\$ 183.23	\$ 1,465.80
14	GCL COMPATIBLE PROTECTIVE SOIL COVER PLACEMENT INSIDE PERIMETER BERM (FROM NEAREST COMPLIANT BORROW AREA)	30376	CY	\$ 9.01	\$ 273,827.75
15	FURNISH AND INSTALL NORTHWEST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	155	LF	\$ 61.48	\$ 9,541.67
16	FURNISH AND INSTALL NORTHEAST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	262	LF	\$ 56.86	\$ 14,880.93
17	FURNISH AND INSTALL SOUTHWEST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	229	LF	\$ 61.87	\$ 14,173.78
18	FURNISH AND INSTALL SOUTHEAST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	125	LF	\$ 56.86	\$ 7,119.19
19	FURNISH AND INSTALL PRE FABRICATED STORM DRAIN INLET BOXES ON CLOSURE CAP	4	EA	\$ 5,240.24	\$ 20,960.94

Table C.9 (CDA) Cell 8 Clos

20	FURNISH AND INSTALL STORMDRAIN MANHOLES FOR DOWNSPOUTS	4	EA	\$ 4,486.40	\$ 17,945.58
21	FURNISH AND INSTALL USBR TYPE 2 BAFFLED OUTLET STRUCTURES	2	EA	\$ 10,316.09	\$ 20,632.18
22	INSTALL 60-MIL HDPE TEXTURED GEOMEMBRANE IN PERIMETER DRAINAGE DITCH	59643	SF	\$ 0.21	\$ 12,489.24
23	CLOSURE CAP ACCESS RAMP CONSTRUCTION (FROM NEAREST COMPLIANT BORROW AREA)	1	LS	\$ 26,886.96	\$ 26,886.96
24	FILL PLACEMENT AND COMPACTION TO REPLACE MATERIAL REMOVED WITH THE SOUTHWEST CELL ACCESS RAMP (FROM NEAREST COMPLIANT BORROW AREA)	1	LS	\$ 15,924.87	\$ 15,924.87
25	FILL PLACEMENT AND COMPACTION TO REPLACE MATERIAL REMOVED WITH THE CELL ACCESS RAMP AT THE MIDDLE OF THE NORTH EMBANKMENT (FROM NEAREST COMPLIANT BORROW AREA]	1	LS	\$ 23,505.15	\$ 23,505.15
26	FURNISH AND INSTALL 18-INCH DIA. STORM DRAIN (INCLUDING TRANSITION ELBOWS)	799	LF	\$ 44.90	\$ 35,884.86
27	FURNISH AND INSTALL STORM DRAIN GRATED INLET BOX BETWEEN CELLS 8 AND 9	2	LS	\$ 8,376.00	\$ 16,752.00
28	RE-GRADE TOP OF COMMON EMBANKMENT BETWEEN CELLS 7 AND 8 TO DRAIN TO GRATED STORM DRAIN INLET BOXES (FILL FROM NEAREST COMPLIANT BORROW AREA]	1	LS	\$ 13,270.73	\$ 13,270.73
29	PLACE AND COMPACT FILL AS REQUIRED TO RE-GRADE TOP OF COMMON EMBANKMENT BETWEEN CELLS 7 AND 8 TO DRAIN TO GRATED STORM DRAIN INLET BOX (FILL FROM NEAREST COMPLIANT BORROW AREA]	1	LS	\$ 3,790.14	\$ 3,790.14
30	MINE 4-INCH STONE CHIPS FROM BLM QUARRY IN ACCORDANCE TO SPECIFICATIONS & STOCKPILE	13219	CY	\$ 33.14	\$ 438,042.68
31	PLACE STONE MULCH ON EXTERIOR SLOPES AND TOP SURFACES OF THE CLOSURE CAP (STOCKPILED IN BLM STONE BORROW AREA]	12247	CY	\$ 16.75	\$ 205,165.03
32	PLACE STONE MULCH ON THE EXTERIOR SLOPES OF CELL 7 TO REPLACE STONE MULCH REMOVED DURING INSTALLATION OF THE SOUTHWEST AND MIDDLE NORTH DOWNSPOUTS (STOCKPILED IN BLM STONE BORROW AREA]	189	CY	\$ 16.75	\$ 3,158.01
33	PLACE ROAD BASE ON THE CLOSURE CAP ACCESS RAMP, AND TO REPLACE ROAD BASE REMOVED, COVERED, OR DISTURBED AROUND THE TOP PERIMETER OF CELL 7, ASSOCIATED WITH REMOVAL OF THE SOUTHWEST AND MIDDLE NORTH ACCESS RAMPS, AND ALONG THE REGRADED SURFACES OF THE COMMON EMBANKMENTS BETWEEN CELLS 7 AND 8 (PURCHASE AND HAUL FROM OTHER OFF SITE SOURCE OR BLM STONE BORROW)	972	CY	\$ 63.39	\$ 61,593.22

Table C.9 (CDA) Cell 8 Clos

34	UNLOADING, HANDLING, AND STORING GEOSYNTHETIC ROLLS	1	LS	\$ 18,950.70	\$ 18,950.70
35	TESTFILL CONSTRUCTION	1	LS	\$ 18,846.00	\$ 18,846.00
TOTAL EARTHWORK BID				Sub-Total	\$ 3,332,465
GEOSYNTHETICS - MATERIAL					
36	60-mil HDPE Geomembrane (Textured)	797488	SF	\$ 0.64	\$ 512,671.41
37	8-Mil HDPE	18111	SF	\$ 0.13	\$ 2,351.30
38	GCL	488012	SF	\$ 0.55	\$ 267,226.12
38	Geocomposite	534055	SF	\$ 0.71	\$ 377,988.91
				Tax (5.95%)	\$ 69,034.15
Note: Assumed Lap and Scrap for Geosynthetics Material Quantities				Sub-Total	\$ 1,229,272
GEOSYNTHETICS - INSTALLATION					
41	60-mil HDPE Geomembrane (Textured)	665346	SF	\$ 0.13	\$ 87,077.15
42	8-Mil HDPE	18111	SF	\$ 0.11	\$ 1,991.02
43	GCL	443647	SF	\$ 0.11	\$ 50,165.86
44	Geocomposite	485504	SF	\$ 0.12	\$ 58,457.13
45	Pipe Boot (for Gas Vents)	8	EA	\$ 392.63	\$ 3,141.00
46	Pipe Boots (for Cell Leachate Pipes)	12	EA	\$ 392.63	\$ 4,711.50
47	Extrusion Weld	2935	LF	\$ 7.59	\$ 22,281.89
48	Mobilization/Demobilization	1	LS	\$ 6,805.50	\$ 6,805.50
				Sub-Total	\$ 234,631
MISCELLANEOUS SERVICES					
48	CQA SERVICES	1	LS	\$ -	\$ -
49	AS-BUILT SURVEY	1	LS	\$ -	\$ -
50	DESIGN DRAWINGS/BID DOCUMENTS	1	LS	\$ -	\$ -
				Sub-Total	\$ -
TOTAL CLOSURE COST					\$ 4,796,368

Table C.10: Cost Documentation (CDA)
RCRA/TSCA Cell B6 Closure Cost Estimate

BID ITEM	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	Total Cost
EARTHWORK					
1	MOBILIZATION AND DEMOBILIZATION	1	LS	\$ 219,870.00	\$ 219,870.00
2	PERFORMANCE AND PAYMENT BONDS	1	LS	\$ 36,645.00	\$ 36,645.00
3	REMOVE DEBRIS FENCE AROUND TOP PERIMETER OF CELL B6	1	LS	\$ 7,381.35	\$ 7,381.35
4	GRADE 1.5H:1V SLOPES AROUND WASTE PERIMETER AND RAMP AREAS AND FINE GRADE WASTE AS NEEDED	1	LS	\$ 78,237.08	\$ 78,237.08
5	REMOVE NORTHWEST RAMP AND PROPERLY DISPOSE OF MATERIAL	1	LS	\$ 8,658.69	\$ 8,658.69
6	REMOVE MIDDLE EAST RAMP AND PROPERLY DISPOSE OF MATERIAL	1	LS	\$ 8,658.69	\$ 8,658.69
7	MINE, PROCESS, AND STOCKPILE CLAY LINER MATERIAL (FROM MUD FLAT BORROW AREA)	41554	CY	\$ 22.73	\$ 944,543.12
8	OBTAIN (MINE, PURCHASE, BORROW, ETC.), HAUL, AND PLACE GCL COMPATIBLE 6-INCH SOIL LAYER (FROM NEAREST COMPLIANT BORROW AREA)	8362	CY	\$ 8.68	\$ 72,575.18
9	COMPACTED CLAY LINER PLACEMENT (PROCESSED CLAY FROM MUD FLAT BORROW AREA)	41554	CY	\$ 13.09	\$ 543,841.04
10	GEOMEMBRANE ANCHOR TRENCH EXCAVATION AND BACKFILL AROUND BASE OF CLOSURE CAP	3805	LF	\$ 6.81	\$ 25,893.57
11	COMPACTED CLAY SOIL AROUND PERIMETER SLOPES (FROM NEAREST COMPLIANT BORROW AREA)	22036	CY	\$ 15.97	\$ 351,843.01
12	COMPACTED CLAY SOIL FOR PERIMETER BERM AREA AROUND CLOSURE CAP (FROM NEAREST COMPLIANT BORROW AREA)	5899	CY	\$ 17.28	\$ 101,903.06
13	FURNISH AIR-GAS VENTS FOR INSTALLATION BY THE GEOSYNTHETICS INSTALLER (HDPE PIPE AND PLATE)	19	EA	\$ 183.23	\$ 3,481.28
14	GCL COMPATIBLE PROTECTIVE SOIL COVER PLACEMENT INSIDE PERIMETER BERM (FROM NEAREST COMPLIANT BORROW AREA)	32495	CY	\$ 9.01	\$ 292,928.70
15	FURNISH AND INSTALL NORTHWEST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	274	LF	\$ 61.48	\$ 16,845.48
16	FURNISH AND INSTALL NORTH MIDDLE 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	169	LF	\$ -	
17	FURNISH AND INSTALL NORTHEAST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	101	LF	\$ 56.86	\$ 5,754.49
18	FURNISH AND INSTALL SOUTHWEST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	141	LF	\$ 61.87	\$ 8,723.28
19	FURNISH AND INSTALL SOUTH MIDDLE 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	168	LF	\$ 61.87	\$ 10,381.32

Table C.10 (CDA) Cell B6 Clos

20	FURNISH AND INSTALL SOUTHEAST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	100	LF	\$ 56.86	\$ 5,697.63
21	FURNISH AND INSTALL PRE FABRICATED STORM DRAIN INLET BOXES ON CLOSURE CAP	6	EA	\$ 5,240.24	\$ 31,441.41
22	FURNISH AND INSTALL STORMDRAIN MANHOLES FOR DOWNSPOUTS	14	EA	\$ 4,486.40	\$ 62,809.53
23	FURNISH AND INSTALL USBR TYPE 2 BAFFLED OUTLET STRUCTURES	5	EA	\$ 10,316.09	\$ 51,580.46
24	INSTALL 60-MIL HDPE TEXTURED GEOMEMBRANE IN PERIMETER DRAINAGE DITCH	71483	SF	\$ 0.21	\$ 14,968.44
25	CLOSURE CAP ACCESS RAMP CONSTRUCTION (FROM NEAREST COMPLIANT BORROW AREA)	1	LS	\$ 26,886.96	\$ 26,886.96
26	FILL PLACEMENT AND COMPACTION TO REPLACE MATERIAL REMOVED WITH THE NORTHWEST CELL ACCESS RAMP (FROM NEAREST COMPLIANT BORROW AREA)	1	LS	\$ 15,924.87	\$ 15,924.87
27	FILL PLACEMENT AND COMPACTION TO REPLACE MATERIAL REMOVED WITH THE CELL ACCESS RAMP AT THE MIDDLE OF THE EAST EMBANKMENT (FROM NEAREST COMPLIANT BORROW AREA]	1	LS	\$ 23,505.15	\$ 23,505.15
28	FURNISH AND INSTALL 18-INCH DIA. STORM DRAIN (INCLUDING TRANSITION ELBOWS)	1355	LF	\$ 44.90	\$ 60,851.17
29	FURNISH AND INSTALL STORM DRAIN GRATED INLET BOX BETWEEN CELLS 5 AND B6	0	LS	\$ 8,376.00	\$ -
30	RE-GRADE TOP OF COMMON EMBANKMENT BETWEEN CELLS 5 AND B6 TO DRAIN TO GRATED STORM DRAIN INLET BOX AT THE SOUTH END OF THE EMBANKMENT	1	LS	\$ 13,270.73	\$ 13,270.73
31	PLACE AND COMPACT FILL AS REQUIRED TO RE-GRADE TOP OF NORTH AND SOUTH EMBANKMENTS TO DRAIN TO GRATED STORM DRAIN INLET MANHOLES	1	LS	\$ 3,790.14	\$ 3,790.14
32	MINE 4-INCH STONE CHIPS FROM BLM QUARRY IN ACCORDANCE TO SPECIFICATIONS & STOCKPILE	9872	CY	\$ 33.14	\$ 327,117.88
33	PLACE STONE MULCH ON EXTERIOR SLOPES AND TOP SURFACES OF THE CLOSURE CAP (STOCKPILED IN BLM STONE BORROW AREA]	9769	CY	\$ 16.75	\$ 163,657.29
34	PLACE STONE MULCH ON THE EXTERIOR SLOPES OF CELL B6 TO REPLACE STONE MULCH REMOVED DURING INSTALLATION OF DOWNSPOUTS	102	CY	\$ 16.75	\$ 1,710.36
35	PLACE ROAD BASE ON THE CLOSURE CAP ACCESS RAMP, AND TO REPLACE ROAD BASE REMOVED, COVERED, OR DISTURBED AROUND THE TOP PERIMETER OF CELL B6, ASSOCIATED WITH REMOVAL OF THE NORTHWEST AND MIDDLE EAST ACCESS RAMPS, AND ALONG THE REGRADED SURFACES	515	CY	\$ 63.39	\$ 32,667.42
36	UNLOADING, HANDLING, AND STORING GEOSYNTHETIC ROLLS	1	LS	\$ 18,950.70	\$ 18,950.70
37	TESTFILL CONSTRUCTION	1	LS	\$ 18,846.00	\$ 18,846.00
	TOTAL EARTHWORK BID			Sub-Total	\$ 3,611,840

Table C.10 (CDA) Cell B6 Clos

GEOSYNTHETICS- MATERIAL					
38	60-mil HDPE Geomembrane (Textured)	990880	SF	\$ 0.64	\$ 636,995.43
39	8-Mil HDPE	25421	SF	\$ 0.13	\$ 3,300.38
40	GCL	526580	SF	\$ 0.55	\$ 288,345.04
41	Geocomposite	576003	SF	\$ 0.71	\$ 407,679.06
				Tax (5.95%)	\$79,511
	Note: Assumed Lap and Scrap for Geosynthetics Material Quantities			Sub-Total	\$ 1,415,831
GEOSYNTHETICS- INSTALLATION					
42	60-mil HDPE Geomembrane (Textured)	790153	SF	\$ 0.13	\$ 103,411.23
43	8-Mil HDPE	22105	SF	\$ 0.11	\$ 2,430.16
44	GCL	457895	SF	\$ 0.11	\$ 51,776.98
45	Geocomposite	500873	SF	\$ 0.12	\$ 60,307.55
46	Pipe Boot (gas vents)	19	EA	\$ 392.63	\$ 7,459.88
47	Leachate Pipe Boots	24	EA	\$ 392.63	\$ 9,423.00
48	Extrusion Weld	3799	LF	\$ 7.59	\$ 28,834.22
49	Mobilization/Demobilization	\$1	LS	\$ 6,805.50	\$ 6,805.50
				Sub-Total	\$ 270,449
MISCELLANEOUS SERVICES					
50	CQA SERVICES		LS	\$ -	\$ -
51	AS-BUILT SURVEY		LS	\$ -	\$ -
52	DESIGN DRAWINGS/BID DOCUMENTS		LS	\$ -	\$ -
53	TSCA SAMPLING		LS	\$ -	\$ -
				Sub-Total	\$ -
TOTAL CLOSURE COST					\$ 5,298,120

Table C.11: Cost Documentation (CDA)
RCRA Cell 7 Closure Cost Estimate

BID ITEM	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	Total Cost
EARTHWORK					
1	MOBILIZATION AND DEMOBILIZATION	1	LS	\$ 219,870.00	\$ 219,870.00
2	PERFORMANCE AND PAYMENT BONDS	1	LS	\$ 36,645.00	\$ 36,645.00
3	REMOVE DEBRIS FENCE AROUND TOP PERIMETER OF CELL 7	1	LS	\$ 7,381.35	\$ 7,381.35
4	GRADE 1.5H:1V SLOPES AROUND WASTE PERIMETER AND RAMP AREAS AND FINE GRADE WASTE AS NEEDED	1	LS	\$ 78,237.08	\$ 78,237.08
5	REMOVE SOUTHWEST RAMP AND PROPERLY DISPOSE OF MATERIAL	1	LS	\$ 8,658.69	\$ 8,658.69
6	REMOVE MIDDLE NORTH RAMP AND PROPERLY DISPOSE OF MATERIAL	1	LS	\$ 8,658.69	\$ 8,658.69
7	MINE, PROCESS, AND STOCKPILE CLAY LINER MATERIAL (FROM MUD FLAT BORROW AREA)	41861	CY	\$ 22.73	\$ 951,515.43
8	OBTAIN (MINE, PURCHASE, BORROW, ETC.), HAUL, AND PLACE GCL COMPATIBLE 6-INCH SOIL LAYER (FROM NEAREST COMPLIANT BORROW AREA)	7813	CY	\$ 8.68	\$ 67,811.70
9	COMPACTED CLAY LINER PLACEMENT (PROCESSED CLAY FROM MUD FLAT BORROW AREA)	41861	CY	\$ 13.09	\$ 547,855.50
10	GEOMEMBRANE ANCHOR TRENCH EXCAVATION AND BACKFILL AROUND BASE OF CLOSURE CAP	3287	LF	\$ 6.81	\$ 22,369.00
11	COMPACTED CLAY SOIL AROUND PERIMETER SLOPES (FROM NEAREST COMPLIANT BORROW AREA)	23394	CY	\$ 15.97	\$ 373,522.98
12	COMPACTED CLAY SOIL FOR PERIMETER BERM AREA AROUND CLOSURE CAP (FROM NEAREST COMPLIANT BORROW AREA)	4943	CY	\$ 17.28	\$ 85,390.56
13	FURNISH AIR-GAS VENTS FOR INSTALLATION BY THE GEOSYNTHETICS INSTALLER (HDPE PIPE AND PLATE)	8	EA	\$ 183.23	\$ 1,465.80
14	GCL COMPATIBLE PROTECTIVE SOIL COVER PLACEMENT INSIDE PERIMETER BERM (FROM NEAREST COMPLIANT BORROW AREA)	31030	CY	\$ 9.01	\$ 279,728.95
15	FURNISH AND INSTALL NORTHWEST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	196	LF	\$ 61.48	\$ 12,050.05
16	FURNISH AND INSTALL NORTHEAST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	237	LF	\$ 56.86	\$ 13,476.43
17	FURNISH AND INSTALL SOUTHWEST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	198	LF	\$ 61.87	\$ 12,249.71
18	FURNISH AND INSTALL SOUTHEAST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	226	LF	\$ 56.86	\$ 12,850.94
19	FURNISH AND INSTALL PRE FABRICATED STORM DRAIN INLET BOXES ON CLOSURE CAP	4	EA	\$ 5,240.24	\$ 20,960.94
20	FURNISH AND INSTALL STORMDRAIN MANHOLES FOR DOWNSPOUTS	4	EA	\$ 4,486.40	\$ 17,945.58

Table C.11 (CDA) Cell 7 Clos

21	FURNISH AND INSTALL USBR TYPE 2 BAFFLED OUTLET STRUCTURES	4	EA	\$ 10,316.09	\$ 41,264.36
22	INSTALL 60-MIL HDPE TEXTURED GEOMEMBRANE IN PERIMETER DRAINAGE DITCH	59868	SF	\$ 0.21	\$ 12,536.36
23	CLOSURE CAP ACCESS RAMP CONSTRUCTION (FROM NEAREST COMPLIANT BORROW AREA)	1	LS	\$ 26,886.96	\$ 26,886.96
24	FILL PLACEMENT AND COMPACTION TO REPLACE MATERIAL REMOVED WITH THE SOUTHWEST CELL ACCESS RAMP (FROM NEAREST COMPLIANT BORROW AREA)	1	LS	\$ 15,924.87	\$ 15,924.87
25	FILL PLACEMENT AND COMPACTION TO REPLACE MATERIAL REMOVED WITH THE CELL ACCESS RAMP AT THE MIDDLE OF THE NORTH EMBANKMENT (FROM NEAREST COMPLIANT BORROW AREA)	1	LS	\$ 23,505.15	\$ 23,505.15
26	FURNISH AND INSTALL 18-INCH DIA. STORM DRAIN (INCLUDING TRANSITION ELBOWS)	0	LF	\$ 44.90	\$ -
27	FURNISH AND INSTALL STORM DRAIN GRATED INLET BOX BETWEEN CELLS 7 AND 8	1	LS	\$ 8,376.00	\$ 8,376.00
28	RE-GRADE TOP OF COMMON EMBANKMENT BETWEEN CELLS 7 AND 8 TO DRAIN TO GRATED STORM DRAIN INLET BOXES (FILL FROM NEAREST COMPLIANT BORROW AREA)	1	LS	\$ 13,270.73	\$ 13,270.73
29	PLACE AND COMPACT FILL AS REQUIRED TO RE-GRADE TOP OF COMMON EMBANKMENT BETWEEN CELLS 7 AND 8 TO DRAIN TO GRATED STORM DRAIN INLET BOX (FILL FROM NEAREST COMPLIANT BORROW AREA)	1	LS	\$ 3,790.14	\$ 3,790.14
30	MINE 4-INCH STONE CHIPS FROM BLM QUARRY IN ACCORDANCE TO SPECIFICATIONS & STOCKPILE	9538	CY	\$ 33.14	\$ 316,052.71
31	PLACE STONE MULCH ON EXTERIOR SLOPES AND TOP SURFACES OF THE CLOSURE CAP (STOCKPILED IN BLM STONE BORROW AREA)	8997	CY	\$ 16.75	\$ 150,722.84
32	PLACE STONE MULCH ON THE EXTERIOR SLOPES OF CELL 7 TO REPLACE STONE MULCH REMOVED DURING INSTALLATION OF THE SOUTHWEST AND MIDDLE NORTH DOWNSPOUTS (STOCKPILED IN BLM STONE BORROW AREA)	209	CY	\$ 16.75	\$ 3,509.36
33	PLACE ROAD BASE ON THE CLOSURE CAP ACCESS RAMP, AND TO REPLACE ROAD BASE REMOVED, COVERED, OR DISTURBED AROUND THE TOP PERIMETER OF CELL 7, ASSOCIATED WITH REMOVAL OF THE SOUTHWEST AND MIDDLE NORTH ACCESS RAMPS, AND ALONG THE REGRADED SURFACES OF THE COMMON EMBANKMENTS BETWEEN CELLS 7 AND 8 (PURCHASE AND HAUL FROM OTHER OFF SITE SOURCE OR BLM STONE BORROW)	540	CY	\$ 63.39	\$ 34,246.89
34	UNLOADING, HANDLING, AND STORING GEOSYNTHETIC ROLLS	1	LS	\$ 18,950.70	\$ 18,950.70
35	TESTFILL CONSTRUCTION	1	LS	\$ 18,846.00	\$ 18,846.00
	TOTAL EARTHWORK BID				\$ 3,466,527

Table C.11 (CDA) Cell 7 Clos

GEOSYNTHETICS - MATERIAL					
36	60-mil HDPE Geomembrane (Textured)	917564	SF	\$ 0.64	\$ 589,863.22
37	8-Mil HDPE	24313	SF	\$ 0.13	\$ 3,156.55
38	GCL	491433	SF	\$ 0.55	\$ 269,099.35
38	Geocomposite	552033	SF	\$ 0.71	\$ 390,713.83
				Tax (5.95%)	\$ 74,543.56
	Note: Assumed Lap and Scrap for Geosynthetics Material Quantities			Sub-Total	\$ 1,327,377
GEOSYNTHETICS - INSTALLATION					
41	60-mil HDPE Geomembrane (Textured)	738014	SF	\$ 0.13	\$ 96,587.52
42	8-Mil HDPE	24313	SF	\$ 0.11	\$ 2,672.88
43	GCL	427333	SF	\$ 0.11	\$ 48,321.11
44	Geocomposite	480029	SF	\$ 0.12	\$ 57,797.90
45	Pipe Boot	8	EA	\$ 392.63	\$ 3,141.00
46	Extrusion Weld	2726	LF	\$ 7.59	\$ 20,689.35
47	Mobilization/Demobilization	1	LS	\$ 6,805.50	\$ 6,805.50
				Sub-Total	\$ 236,015
MISCELLANEOUS SERVICES					
48	CQA SERVICES	1	LS	\$ -	\$ -
49	AS-BUILT SURVEY	1	LS	\$ -	\$ -
50	DESIGN DRAWINGS/BID DOCUMENTS	1	LS	\$ -	\$ -
				Sub-Total	\$ -
TOTAL CLOSURE COST					\$ 5,029,919

**TABLE D.1: Container Management Facility, Leachate Tanks,
Drain and Flush Building Warehouse One and Bulk Solids
Storage Area at Time of Closure**

STORAGE UNIT NAME	MAXIMUM INVENTORY (equivalent volume)	MAXIMUM INVENTORY (in gallons)
Container Management Facility Dock 1 (TD01) Storage Pad 2 (SP01 & NP01) Storage Pad 3A (TD02) Storage Pad 3B (SPAD)	2,302 55-Gallon Drums	126,610 Gallons
Container Management Facility Storage (TD01)	342 55-Gallon Drums	18,810 Gallons
Drain and Flush Building One	460 55-Gallon Drums	25,300 Gallons
Leachate Tanks 119-TN-002		17,000 Gallons
Bulk Solids Storage Area	124 20-CY Boxes	500,896 Gallons

Table D.2

**Table D.2: On-Site Management - Landfill Disposal
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	342 (Table B.1, 4a)	925 (Table B.1, 7a)	110 (Table B.2, 4q)
Bulk Solid Storage Areas (BSSAs)	N/A	3,200 (Table B.1, 1d)	N/A
Put-Piles in Landfill	N/A	4,097 (Table B.6, 3q)	N/A
Stabilization Tank System	N/A	N/A	82 (Table B.8, 2s)
Leachate Tank System	N/A	N/A	37.3 (Table B.8, 3s)
Leachate Building	N/A	N/A	N/A
Surface Impoundment Unit A	N/A	N/A	2,410 (Table B.8, 4q)
Ancillary Closure Activities	N/A	N/A	1,340.3 (Table B.11, 9b)
SUMMARY TOTALS:	342	8,222	3,979.4
"Landfill Capacity Assurance Requirement at the Time of Closure:			12,543
Note: The information presented in this tabel has been consolidated from the closure cost CMF and CLO worksheets (Tables B.1 to B.12) and Cost Documentation Appendix (Tables C.1 to C.11).			

**Table D.3: Facility Roadways - Dimensions and Volumes
Based on Type**

Roadway Type/Location	Approximate Dimensions		Volume (0.5' depth)
	Length	Average Width	
Type A			
Stabilization to Cell B/6	1,351 ft	24 ft	600 cy
Stabilization to Cell 7	1,914 ft	19 ft	673 cy
Stabilization to Cell 8	1,914 ft	19 ft	673 cy
SW Cell 7 Exist to WW	1,413 ft	24 ft	628 cy
E-W Road N of Cell 7	1,240 ft	24 ft	551 cy
Type A Total Volume			3,125 cy
Type B			
Fr. Sampling Pad to SE corner of Cell Z	1,668 ft	30 ft	927 cy
Fr. Above to PCB Building	1,260 ft	30 ft	700 cy
Fr. Above to Stabilization	2,370 ft	24 ft	1,053 cy
Fr. PCB tanks to Type A road	340 ft	24 ft	151 cy
Type B Total Volume			2,831 cy
Type C			
Fr. Old WW to corner E of Cell A	1,288 ft	30 ft	716 cy
From above to road west side of Cell Y	2,281 ft	30 ft	1,267 cy
Type C Total Volume			1,983 cy

Table D.4: 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 D.4, 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.
2. The parameters listed in Table D.4 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.
3. It must 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".
4. 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.
5. 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.

6. 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 D.4 were chosen based upon these considerations.

Table D.5: List of HWMR Units and Number of Associated Groundwater Monitoring Wells	
RCRA/Utah HWMR Units	PERMITTED MONITORING WELLS
Landfill Cells 1, 2, 3, 4, 5, 7, 8, B6, & IWC-1 and IWC-2	81

Table D.7

Table D.7: Leachate Pumping Rates and Frequencies

Frequency	If at or less than this amount, go to the 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

Table D.8: DFBWO 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

Table D.9: Bulk Tank Descriptions DFBWO, Area B

Tank ID	Tank 3A	Tank 3B
Length (Feet)	14.25	14.25
Diameter (Feet)	6.00	6.00
Capacity (Gallons)	3,014	3,014

Table D.10-D.11

Table D.10: 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)

Table D.11: 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)	3,665	1,717	5,437
Sump Volume (Ft ³)	42.67	16	42.67
Ramp Volume (Ft ³)	131.3	53.2	0
Tank Pad Volume (Ft ³)	601.5	0	715.8
Net Volume (Ft ³)	2,975	1,680	4,764
Net Volume (Gallons)	22,252	12,568	35,636

Table D.12: Estimate of PCB Waste Type Percentages

Waste Type	Percentage
Askarel	42%
Transformers (Drained)	42%
Capacitors	14%
Debris	2%

Table D.13: DFBWO 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

Table D.14: 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

Table D.15: 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

Table D.16: 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

Table D.17: Numerical Standards for PCB Decontamination

CONDITIONS	DECONTAMINATION STANDARDS
High Contact Indoor or Outdoor Solid Surfaces	Clean to 10-micrograms/100 cm ² (as measured by standard wipe test)
Low Contact, Outdoor, Impervious Solid Surfaces	Clean to 10-micrograms/100 cm ² (as measured by standard wipe test)
Low Contact, Outdoor, Non-Impervious Solid Surfaces	Clean to 10-micrograms/100 cm ² (as measured by standard wipe test)
For Spill Cleanups, PCB Contaminated Soil	Remove to 10 ppm (provided soils is excavated to a minimum of 10 inches) Excavated soil to be replaces with clean soil < 1 mg/kg dry weight basis (ppm) PCB's.
As Bulk PCB Remediation Waste, PCB Contaminated Soil and Other Non-Pervious Surfaces	Remove to 1 ppm

Table D.18: Anticipated Closure Schedule for RCRA/TSCA Cells

Day	Activity
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.

Table D.19: Post-Closure Leachate Pumping and Quantifying Frequency

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

Table D.20: Post-Closure Leachate Sampling Frequency

POST-CLOSURE YEAR	FREQUENCY
Upper Collection Systems	
1-8	Semi-Annually
9-30	Annually
Secondary and Tertiary Sumps	
1-5	Quarterly
6-8	Semi-Annually
9-30	Annually
Note: Sampling for PCB's and Chlorinated Organics	

Grassy Mountain - RCRA Cell 7 Closure Cost Estimate

Prepared By: Faizur Khan

Date: 6-22-21

This estimate is calculated in 2021 U.S. dollars.

BID ITEM	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	Total Cost
1	MOBILIZATION AND DEMOBILIZATION	1	LS	\$210,000.00	\$210,000.00
2	PERFORMANCE AND PAYMENT BONDS	1	LS	\$35,000.00	\$35,000.00
3	REMOVE DEBRIS FENCE AROUND TOP PERIMETER OF CELL 7	1	LS	\$7,050.00	\$7,050.00
4	GRADE 1.5H:1V SLOPES AROUND WASTE PERIMETER AND RAMP AREAS AND FINE GRADE WASTE AS NEEDED	1	LS	\$74,725.00	\$74,725.00
5	REMOVE SOUTHWEST RAMP AND PROPERLY DISPOSE OF MATERIAL	1	LS	\$8,270.00	\$8,270.00
6	REMOVE MIDDLE NORTH RAMP AND PROPERLY DISPOSE OF MATERIAL	1	LS	\$8,270.00	\$8,270.00
7	MINE, PROCESS, AND STOCKPILE CLAY LINER MATERIAL (FROM MUD FLAT BORROW AREA)	41,861	CY	\$21.71	\$908,801.75
8	OBTAIN (MINE, PURCHASE, BORROW, ETC.), HAUL, AND PLACE GCL COMPATIBLE 6-INCH SOIL LAYER (FROM NEAREST COMPLIANT BORROW AREA)	7,813	CY	\$8.29	\$64,767.62
9	COMPACTED CLAY LINER PLACEMENT (PROCESSED CLAY FROM MUD FLAT BORROW AREA)	41,861	CY	\$12.50	\$523,262.18
10	GEOMEMBRANE ANCHOR TRENCH EXCAVATION AND BACKFILL AROUND BASE OF CLOSURE CAP	3,287	LF	\$6.50	\$21,364.85
11	COMPACTED CLAY SOIL AROUND PERIMETER SLOPES (FROM NEAREST COMPLIANT BORROW AREA)	23,394	CY	\$15.25	\$356,755.47
12	COMPACTED CLAY SOIL FOR PERIMETER BERM AREA AROUND CLOSURE CAP (FROM NEAREST COMPLIANT BORROW AREA)	4,943	CY	\$16.50	\$81,557.36
13	FURNISH AIR-GAS VENTS FOR INSTALLATION BY THE GEOSYNTHETICS INSTALLER (HDPE PIPE AND PLATE)	8	EA	\$175.00	\$1,400.00
14	GCL COMPATIBLE PROTECTIVE SOIL COVER PLACEMENT INSIDE PERIMETER BERM (FROM NEAREST COMPLIANT BORROW AREA)	31,030	CY	\$8.61	\$267,171.87
15	FURNISH AND INSTALL NORTHWEST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	196	LF	\$58.72	\$11,509.12
16	FURNISH AND INSTALL NORTHEAST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	237	LF	\$54.31	\$12,871.47
17	FURNISH AND INSTALL SOUTHWEST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	198	LF	\$59.09	\$11,699.82

18	FURNISH AND INSTALL SOUTHEAST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	226	LF	\$54.31	\$12,274.06
19	FURNISH AND INSTALL PRE FABRICATED STORM DRAIN INLET BOXES ON CLOSURE CAP	4	EA	\$5,005.00	\$20,020.00
20	FURNISH AND INSTALL STORMDRAIN MANHOLES FOR DOWNSPOUTS	4	EA	\$4,285.00	\$17,140.00
21	FURNISH AND INSTALL USBR TYPE 2 BAFFLED OUTLET STRUCTURES	4	EA	\$9,853.00	\$39,412.00
22	INSTALL 60-MIL HDPE TEXTURED GEOMEMBRANE IN PERIMETER DRAINAGE DITCH	59,868	SF	\$0.20	\$11,973.60
23	CLOSURE CAP ACCESS RAMP CONSTRUCTION (FROM NEAREST COMPLIANT BORROW AREA)	1	LS	\$25,680.00	\$25,680.00
24	FILL PLACEMENT AND COMPACTION TO REPLACE MATERIAL REMOVED WITH THE SOUTHWEST CELL ACCESS RAMP (FROM NEAREST COMPLIANT BORROW AREA)	1	LS	\$15,210.00	\$15,210.00
25	FILL PLACEMENT AND COMPACTION TO REPLACE MATERIAL REMOVED WITH THE CELL ACCESS RAMP AT THE MIDDLE OF THE NORTH EMBANKMENT (FROM NEAREST COMPLIANT BORROW AREA]	1	LS	\$22,450.00	\$22,450.00
26	FURNISH AND INSTALL 18-INCH DIA. STORM DRAIN (INCLUDING TRANSITION ELBOWS)	0	LF	\$42.88	\$0.00
27	FURNISH AND INSTALL STORM DRAIN GRATED INLET BOX BETWEEN CELLS 7 AND 8	1	LS	\$8,000.00	\$8,000.00
28	RE-GRADE TOP OF COMMON EMBANKMENT BETWEEN CELLS 7 AND 8 TO DRAIN TO GRATED STORM DRAIN INLET BOXES (FILL FROM NEAREST COMPLIANT BORROW AREA]	1	LS	\$12,675.00	\$12,675.00
29	PLACE AND COMPACT FILL AS REQUIRED TO RE-GRADE TOP OF COMMON EMBANKMENT BETWEEN CELLS 7 AND 8 TO DRAIN TO GRATED STORM DRAIN INLET BOX (FILL FROM NEAREST COMPLIANT BORROW AREA]	1	LS	\$3,620.00	\$3,620.00
30	MINE 4-INCH STONE CHIPS FROM BLM QUARRY IN ACCORDANCE TO SPECIFICATIONS & STOCKPILE	9,538	CY	\$31.65	\$301,865.06
31	PLACE STONE MULCH ON EXTERIOR SLOPES AND TOP SURFACES OF THE CLOSURE CAP (STOCKPILED IN BLM STONE BORROW AREA]	8,997	CY	\$16.00	\$143,956.87
32	PLACE STONE MULCH ON THE EXTERIOR SLOPES OF CELL 7 TO REPLACE STONE MULCH REMOVED DURING INSTALLATION OF THE SOUTHWEST AND MIDDLE NORTH DOWNSPOUTS (STOCKPILED IN BLM STONE BORROW AREA]	209	CY	\$16.00	\$3,351.82

33	PLACE ROAD BASE ON THE CLOSURE CAP ACCESS RAMP, AND TO REPLACE ROAD BASE REMOVED, COVERED, OR DISTURBED AROUND THE TOP PERIMETER OF CELL 7, ASSOCIATED WITH REMOVAL OF THE SOUTHWEST AND MIDDLE NORTH ACCESS RAMPS, AND ALONG THE REGRADED SURFACES OF THE COMMON EMBANKMENTS BETWEEN CELLS 7 AND 8 (PURCHASE AND HAUL FROM OTHER OFF SITE SOURCE OR BLM STONE BORROW)	540	CY	\$60.54	\$32,709.54
34	UNLOADING, HANDLING, AND STORING GEOSYNTHETIC ROLLS	1	LS	\$18,100.00	\$18,100.00
35	TESTFILL CONSTRUCTION	1	LS	\$18,000.00	\$18,000.00
TOTAL EARTHWORK BID					\$3,310,914
GEOSYNTHETICS- MATERIAL					
36	60-mil HDPE Geomembrane (Textured)	917,564	SF	\$0.614	\$563,384
37	8-Mil HDPE	24,313	SF	\$0.124	\$3,015
38	GCL	491,433	SF	\$0.523	\$257,019
38	Geocomposite	552,033	SF	\$0.676	\$373,175
				Tax (5.95%)	\$71,197
	Note: Assumed Lap and Scrap for Geosynthetics Material Quantities	15%		Sub-Total	\$1,267,790
GEOSYNTHETICS- INSTALLATION					
41	60-mil HDPE Geomembrane (Textured)	738,014	SF	\$0.125	\$92,252
42	8-Mil HDPE	24,313	SF	\$0.105	\$2,553
43	GCL	427,333	SF	\$0.108	\$46,152
44	Geocomposite	480,029	SF	\$0.115	\$55,203
45	Pipe Boot	8	EA	\$375.00	\$3,000
46	Extrusion Weld	2,726	LF	\$7.25	\$19,761
47	Mobilization/Demobilization	1	LS	\$6,500.00	\$6,500
Sub-Total					\$225,421
MISCELLANEOUS SERVICES					
48	CQA SERVICES		LS		\$0
49	AS-BUILT SURVEY		LS		\$0
50	DESIGN DRAWINGS/BID DOCUMENTS		LS		\$0
Sub-Total					\$0
Total Closure Cost					\$4,804,125

Grassy Mountain - RCRA-TSCA Cell 8 Closure Cost Estimate

Prepared By: Faizur Khan

Date: 6-22-21

This estimate is calculated in 2021 U.S. dollars.

BID ITEM	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	Total Cost
1	MOBILIZATION AND DEMOBILIZATION	1	LS	\$210,000.00	\$210,000.00
2	PERFORMANCE AND PAYMENT BONDS	1	LS	\$35,000.00	\$35,000.00
3	REMOVE DEBRIS FENCE AROUND TOP PERIMETER OF CELL 7	1	LS	\$7,050.00	\$7,050.00
4	GRADE 1.5H:1V SLOPES AROUND WASTE PERIMETER AND RAMP AREAS AND FINE GRADE WASTE AS NEEDED	1	LS	\$74,725.00	\$74,725.00
5	REMOVE SOUTHWEST RAMP AND PROPERLY DISPOSE OF MATERIAL	1	LS	\$8,270.00	\$8,270.00
6	REMOVE MIDDLE NORTH RAMP AND PROPERLY DISPOSE OF MATERIAL	1	LS	\$8,270.00	\$8,270.00
7	MINE, PROCESS, AND STOCKPILE CLAY LINER MATERIAL (FROM MUD FLAT BORROW AREA)	34,190	CY	\$21.71	\$742,271.69
8	OBTAIN (MINE, PURCHASE, BORROW, ETC.), HAUL, AND PLACE GCL COMPATIBLE 6-INCH SOIL LAYER (FROM NEAREST COMPLIANT BORROW AREA)	8,116	CY	\$8.29	\$67,281.99
9	COMPACTED CLAY LINER PLACEMENT (PROCESSED CLAY FROM MUD FLAT BORROW AREA)	34,190	CY	\$12.50	\$427,378.91
10	GEOMEMBRANE ANCHOR TRENCH EXCAVATION AND BACKFILL AROUND BASE OF CLOSURE CAP	3,140	LF	\$6.50	\$20,408.05
11	COMPACTED CLAY SOIL AROUND PERIMETER SLOPES (FROM NEAREST COMPLIANT BORROW AREA)	15,674	CY	\$15.25	\$239,032.14
12	COMPACTED CLAY SOIL FOR PERIMETER BERM AREA AROUND CLOSURE CAP (FROM NEAREST COMPLIANT BORROW AREA)	7,612	CY	\$16.50	\$125,601.25
13	FURNISH AIR-GAS VENTS FOR INSTALLATION BY THE GEOSYNTHETICS INSTALLER (HDPE PIPE AND PLATE)	8	EA	\$175.00	\$1,400.00
14	GCL COMPATIBLE PROTECTIVE SOIL COVER PLACEMENT INSIDE PERIMETER BERM (FROM NEAREST COMPLIANT BORROW AREA)	30,376	CY	\$8.61	\$261,535.57
15	FURNISH AND INSTALL NORTHWEST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	155.2	LF	\$58.72	\$9,113.34
16	FURNISH AND INSTALL NORTHEAST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	261.7	LF	\$54.31	\$14,212.93
17	FURNISH AND INSTALL SOUTHWEST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	229.1	LF	\$59.09	\$13,537.52

18	FURNISH AND INSTALL SOUTHEAST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	125.2	LF	\$54.31	\$6,799.61
19	FURNISH AND INSTALL PRE FABRICATED STORM DRAIN INLET BOXES ON CLOSURE CAP	4	EA	\$5,005.00	\$20,020.00
20	FURNISH AND INSTALL STORMDRAIN MANHOLES FOR DOWNSPOUTS	4	EA	\$4,285.00	\$17,140.00
21	FURNISH AND INSTALL USBR TYPE 2 BAFFLED OUTLET STRUCTURES	2	EA	\$9,853.00	\$19,706.00
22	INSTALL 60-MIL HDPE TEXTURED GEOMEMBRANE IN PERIMETER DRAINAGE DITCH	59,643	SF	\$0.20	\$11,928.60
23	CLOSURE CAP ACCESS RAMP CONSTRUCTION (FROM NEAREST COMPLIANT BORROW AREA)	1	LS	\$25,680.00	\$25,680.00
24	FILL PLACEMENT AND COMPACTION TO REPLACE MATERIAL REMOVED WITH THE SOUTHWEST CELL ACCESS RAMP (FROM NEAREST COMPLIANT BORROW AREA)	1	LS	\$15,210.00	\$15,210.00
25	FILL PLACEMENT AND COMPACTION TO REPLACE MATERIAL REMOVED WITH THE CELL ACCESS RAMP AT THE MIDDLE OF THE NORTH EMBANKMENT (FROM NEAREST COMPLIANT BORROW AREA]	1	LS	\$22,450.00	\$22,450.00
26	FURNISH AND INSTALL 18-INCH DIA. STORM DRAIN (INCLUDING TRANSITION ELBOWS)	799.3	LF	\$42.88	\$34,273.98
27	FURNISH AND INSTALL STORM DRAIN GRATED INLET BOX BETWEEN CELLS 8 AND 9	2	LS	\$8,000.00	\$16,000.00
28	RE-GRADE TOP OF COMMON EMBANKMENT BETWEEN CELLS 7 AND 8 TO DRAIN TO GRATED STORM DRAIN INLET BOXES (FILL FROM NEAREST COMPLIANT BORROW AREA]	1	LS	\$12,675.00	\$12,675.00
29	PLACE AND COMPACT FILL AS REQUIRED TO RE-GRADE TOP OF COMMON EMBANKMENT BETWEEN CELLS 7 AND 8 TO DRAIN TO GRATED STORM DRAIN INLET BOX (FILL FROM NEAREST COMPLIANT BORROW AREA]	1	LS	\$3,620.00	\$3,620.00
30	MINE 4-INCH STONE CHIPS FROM BLM QUARRY IN ACCORDANCE TO SPECIFICATIONS & STOCKPILE	13,219	CY	\$31.65	\$418,378.88
31	PLACE STONE MULCH ON EXTERIOR SLOPES AND TOP SURFACES OF THE CLOSURE CAP (STOCKPILED IN BLM STONE BORROW AREA]	12,247	CY	\$16.00	\$195,955.13
32	PLACE STONE MULCH ON THE EXTERIOR SLOPES OF CELL 7 TO REPLACE STONE MULCH REMOVED DURING INSTALLATION OF THE SOUTHWEST AND MIDDLE NORTH DOWNSPOUTS (STOCKPILED IN BLM STONE BORROW AREA]	189	CY	\$16.00	\$3,016.25

33	PLACE ROAD BASE ON THE CLOSURE CAP ACCESS RAMP, AND TO REPLACE ROAD BASE REMOVED, COVERED, OR DISTURBED AROUND THE TOP PERIMETER OF CELL 7, ASSOCIATED WITH REMOVAL OF THE SOUTHWEST AND MIDDLE NORTH ACCESS RAMPS, AND ALONG THE REGRADED SURFACES OF THE COMMON EMBANKMENTS BETWEEN CELLS 7 AND 8 (PURCHASE AND HAUL FROM OTHER OFF SITE SOURCE OR BLM STONE BORROW)	972	CY	\$60.54	\$58,828.29
34	UNLOADING, HANDLING, AND STORING GEOSYNTHETIC ROLLS	1	LS	\$18,100.00	\$18,100.00
35	TESTFILL CONSTRUCTION	1	LS	\$18,000.00	\$18,000.00
TOTAL EARTHWORK BID					\$3,182,870
GEOSYNTHETICS- MATERIAL					
36	60-mil HDPE Geomembrane (Textured)	797,488	SF	\$0.614	\$489,658
37	8-Mil HDPE	18,111	SF	\$0.124	\$2,246
38	GCL	488,012	SF	\$0.523	\$255,230
38	Geocomposite	534,055	SF	\$0.676	\$361,021
				Tax (5.95%)	\$65,935
	Note: Assumed Lap and Scrap for Geosynthetics Material Quantities	10%		Sub-Total	\$1,174,090
GEOSYNTHETICS- INSTALLATION					
41	60-mil HDPE Geomembrane (Textured)	665,346	SF	\$0.125	\$83,168
42	8-Mil HDPE	18,111	SF	\$0.105	\$1,902
43	GCL	443,647	SF	\$0.108	\$47,914
44	Geocomposite	485,504	SF	\$0.115	\$55,833
45	Pipe Boot (for Gas Vents)	8	EA	\$375.00	\$3,000
46	Pipe Boots (for Cell Leachate Pipes)	12	EA	\$375.00	\$4,500
47	Extrusion Weld	2,935	LF	\$7.25	\$21,282
48	Mobilization/Demobilization	1	LS	\$6,500.00	\$6,500
Sub-Total					\$224,098
MISCELLANEOUS SERVICES					
48	CQA SERVICES		LS		\$0
49	AS-BUILT SURVEY		LS		\$0
50	DESIGN DRAWINGS/BID DOCUMENTS		LS		\$0
Sub-Total					\$0
Total Closure Cost					\$4,581,058

Grassy Mountain - TSCA Cell B6 Closure Cost Estimate

Prepared By: Faizur Khan

Date: 6-22-21

This estimate is calculated in 2021 U.S. dollars.

BID ITEM	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	Total Cost
1	MOBILIZATION AND DEMOBILIZATION	1	LS	\$210,000.00	\$210,000.00
2	PERFORMANCE AND PAYMENT BONDS	1	LS	\$35,000.00	\$35,000.00
3	REMOVE DEBRIS FENCE AROUND TOP PERIMETER OF CELL B6	1	LS	\$7,050.00	\$7,050.00
4	GRADE 1.5H:1V SLOPES AROUND WASTE PERIMETER AND RAMP AREAS AND FINE GRADE WASTE AS NEEDED	1	LS	\$74,725.00	\$74,725.00
5	REMOVE NORTHWEST RAMP AND PROPERLY DISPOSE OF MATERIAL	1	LS	\$8,270.00	\$8,270.00
6	REMOVE MIDDLE EAST RAMP AND PROPERLY DISPOSE OF MATERIAL	1	LS	\$8,270.00	\$8,270.00
7	MINE, PROCESS, AND STOCKPILE CLAY LINER MATERIAL (FROM MUD FLAT BORROW AREA)	41,554	CY	\$21.71	\$902,142.42
8	OBTAIN (MINE, PURCHASE, BORROW, ETC.), HAUL, AND PLACE GCL COMPATIBLE 6-INCH SOIL LAYER (FROM NEAREST COMPLIANT BORROW AREA)	8,362	CY	\$8.29	\$69,317.26
9	COMPACTED CLAY LINER PLACEMENT (PROCESSED CLAY FROM MUD FLAT BORROW AREA)	41,554	CY	\$12.50	\$519,427.93
10	GEOMEMBRANE ANCHOR TRENCH EXCAVATION AND BACKFILL AROUND BASE OF CLOSURE CAP	3,805	LF	\$6.50	\$24,731.20
11	COMPACTED CLAY SOIL AROUND PERIMETER SLOPES (FROM NEAREST COMPLIANT BORROW AREA)	22,036	CY	\$15.25	\$336,048.72
12	COMPACTED CLAY SOIL FOR PERIMETER BERM AREA AROUND CLOSURE CAP (FROM NEAREST COMPLIANT BORROW AREA)	5,899	CY	\$16.50	\$97,328.61
13	FURNISH AIR-GAS VENTS FOR INSTALLATION BY THE GEOSYNTHETICS INSTALLER (HDPE PIPE AND PLATE)	19	EA	\$175.00	\$3,325.00
14	GCL COMPATIBLE PROTECTIVE SOIL COVER PLACEMENT INSIDE PERIMETER BERM (FROM NEAREST COMPLIANT BORROW AREA)	32,495	CY	\$8.61	\$279,779.08
15	FURNISH AND INSTALL NORTHWEST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	274	LF	\$58.72	\$16,089.28
16	FURNISH AND INSTALL NORTH MIDDLE 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	168.6	LF		
17	FURNISH AND INSTALL NORTHEAST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	101.2	LF	\$54.31	\$5,496.17

18	FURNISH AND INSTALL SOUTHWEST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	141	LF	\$59.09	\$8,331.69
19	FURNISH AND INSTALL SOUTH MIDDLE 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	167.8	LF	\$59.09	\$9,915.30
20	FURNISH AND INSTALL SOUTHEAST 18 INCH DIA. DOWNSPOUT PIPE (INCLUDING TRANSITION ELBOWS)	100.2	LF	\$54.31	\$5,441.86
21	FURNISH AND INSTALL PRE FABRICATED STORM DRAIN INLET BOXES ON CLOSURE CAP	6	EA	\$5,005.00	\$30,030.00
22	FURNISH AND INSTALL STORMDRAIN MANHOLES FOR DOWNSPOUTS	14	EA	\$4,285.00	\$59,990.00
23	FURNISH AND INSTALL USBR TYPE 2 BAFFLED OUTLET STRUCTURES	5	EA	\$9,853.00	\$49,265.00
24	INSTALL 60-MIL HDPE TEXTURED GEOMEMBRANE IN PERIMETER DRAINAGE DITCH	71,483	SF	\$0.20	\$14,296.50
25	CLOSURE CAP ACCESS RAMP CONSTRUCTION (FROM NEAREST COMPLIANT BORROW AREA)	1	LS	\$25,680.00	\$25,680.00
26	FILL PLACEMENT AND COMPACTION TO REPLACE MATERIAL REMOVED WITH THE NORTHWEST CELL ACCESS RAMP (FROM NEAREST COMPLIANT BORROW AREA)	1	LS	\$15,210.00	\$15,210.00
27	FILL PLACEMENT AND COMPACTION TO REPLACE MATERIAL REMOVED WITH THE CELL ACCESS RAMP AT THE MIDDLE OF THE EAST EMBANKMENT (FROM NEAREST COMPLIANT BORROW AREA]	1	LS	\$22,450.00	\$22,450.00
28	FURNISH AND INSTALL 18-INCH DIA. STORM DRAIN (INCLUDING TRANSITION ELBOWS)	1355.4	LF	\$42.88	\$58,119.55
29	FURNISH AND INSTALL STORM DRAIN GRATED INLET BOX BETWEEN CELLS 5 AND B6	0	LS	\$8,000.00	\$0.00
30	RE-GRADE TOP OF COMMON EMBANKMENT BETWEEN CELLS 5 AND B6 TO DRAIN TO GRATED STORM DRAIN INLET BOX AT THE SOUTH END OF THE EMBANKMENT	1	LS	\$12,675.00	\$12,675.00
31	PLACE AND COMPACT FILL AS REQUIRED TO RE-GRADE TOP OF NORTH AND SOUTH EMBANKMENTS TO DRAIN TO GRATED STORM DRAIN INLET MANHOLES	1	LS	\$3,620.00	\$3,620.00
32	MINE 4-INCH STONE CHIPS FROM BLM QUARRY IN ACCORDANCE TO SPECIFICATIONS & STOCKPILE	9,872	CY	\$31.65	\$312,433.50
33	PLACE STONE MULCH ON EXTERIOR SLOPES AND TOP SURFACES OF THE CLOSURE CAP (STOCKPILED IN BLM STONE BORROW AREA]	9,769	CY	\$16.00	\$156,310.69
34	PLACE STONE MULCH ON THE EXTERIOR SLOPES OF CELL B6 TO REPLACE STONE MULCH REMOVED DURING INSTALLATION OF DOWNSPOUTS	102	CY	\$16.00	\$1,633.58

35	PLACE ROAD BASE ON THE CLOSURE CAP ACCESS RAMP, AND TO REPLACE ROAD BASE REMOVED, COVERED, OR DISTURBED AROUND THE TOP PERIMETER OF CELL B6, ASSOCIATED WITH REMOVAL OF THE NORTHWEST AND MIDDLE EAST ACCESS RAMPS, AND ALONG THE REGRADED SURFACES	515	CY	\$60.54	\$31,200.97
36	UNLOADING, HANDLING, AND STORING GEOSYNTHETIC ROLLS	1	LS	\$18,100.00	\$18,100.00
37	TESTFILL CONSTRUCTION	1	LS	\$18,000.00	\$18,000.00
TOTAL EARTHWORK BID					\$3,449,704
GEOSYNTHETICS- MATERIAL					
38	60-mil HDPE Geomembrane (Textured)	990,880	SF	\$0.614	\$608,401
39	8-Mil HDPE	25,421	SF	\$0.124	\$3,152
40	GCL	526,580	SF	\$0.523	\$275,401
41	Geocomposite	576,003	SF	\$0.676	\$389,378
				Tax (5.95%)	\$75,942
	Note: Assumed Lap and Scrap for Geosynthetics Material Quantities	15%		Sub-Total	\$1,352,274
GEOSYNTHETICS- INSTALLATION					
42	60-mil HDPE Geomembrane (Textured)	790,153	SF	\$0.125	\$98,769
43	8-Mil HDPE	22,105	SF	\$0.105	\$2,321
44	GCL	457,895	SF	\$0.108	\$49,453
45	Geocomposite	500,873	SF	\$0.115	\$57,600
46	Pipe Boot (gas vents)	19	EA	\$375.00	\$7,125
47	Leachate Pipe Boots	24	EA	\$375.00	\$9,000
48	Extrusion Weld	3,799	LF	\$7.25	\$27,540
49	Mobilization/Demobilization	1	LS	\$6,500.00	\$6,500
Sub-Total					\$258,308
MISCELLANEOUS SERVICES					
50	CQA SERVICES		LS		\$0
51	AS-BUILT SURVEY		LS		\$0
52	DESIGN DRAWINGS/BID DOCUMENTS		LS		\$0
53	TSCA SAMPLING		LS		\$0
Sub-Total					\$0
Total Closure Cost					\$5,060,286