6 NYCRR PART 373
MODIFICATION REQUEST TO SITEWIDE PART 373 PERMIT
PERMIT ID 9-2934-00022/00097

PERMIT REFERENCE DOCUMENTS

CWM CHEMICAL SERVICES, LLC.
MODEL CITY FACILITY

August 2013
(Revised November/December 2013)

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SITEWIDE PERMIT REFERENCE DOCUMENTS
DEVELOPMENT OF RESIDUALS MANAGEMNET UNIT NO. 2

- "Site-Wide and RMU-1 Closure Cost Estimates", revised and new estimates attached
  - 2.01 New Drum Management Building
  - 4.01 Stabilization Area (Revised)
  - 5.32 AWTS (Fac Pond 5 w/1 tk)
  - 6.01 Fac Ponds (3& 1-2)
  - 6.02 Fac Ponds (3 & 1-2 & New Fac 5)
  - 6.03 Fac Ponds (1-2 & New Fac 5)
  - 8.01 CSA New Full Trailer Parking (5 tankers)
- "Process & Instrumentation Diagrams (PIDs) for Tank Systems", revised portions attached
  - Sheet 3 – RMU-1 Lift Station with RMU-2 Cell 20 (dated 5/23/13). Replaces Sheet 3 (dated 3/20/12)
  - Sheet 9A – SLF-12/RMU-1 Oil Water Separator (RMU-2 Final Buildout, dated 5/23/13). Sheet 9A will replace Sheet 9 (dated 4/24/12) in currently approved P&ID package upon construction of future cells of RMU-2.
- "Aqueous Waste Treatment System Operations and Maintenance (O&M) Manual", revised portions attached
  - Figure 1.1(a) – AWTS Flow Chart. Replaces Figure 1.1 of the currently approved AWTS O&M Manual, dated September 2013 upon construction of Cell 20.
  - Figure 1.1(b) – AWTS Flow Chart. Replaces Figure 1.1(a) of the AWTS O&M Manual upon construction of Cell 17 of RMU-2, closure and demolition of tank T-160 and RMU-1 Lift Station Building, and installation of new leachate transfer forcemains from RMU-1 and RMU-2.
- "Groundwater Sampling and Analysis Plan (GWSAP)", entire revised plan attached
- "RMU-2 Closure Cost Estimate", new estimates
  - 15.01 Residuals Management Unit - 2 (1 cell)
  - 15.02 Residuals Management Unit - 2 (2 cells)
  - 15.03 Residuals Management Unit - 2 (3 cells)
  - 15.04 Residuals Management Unit - 2 (4 cells)
  - 15.05 Residuals Management Unit - 2 (5 cells)
  - 15.06 Residuals Management Unit - 2 (6 cells)

ITEWIDE PERMIT REFERENCE DOCUMENTS
DEVELOPMENT OF RESIDUALS MANAGEMNET UNIT NO. 2
(cont.)

- "RMU-2 Post-Closure Cost Estimate", new estimates
  - PCC-9.01 Residuals Management Unit 2 (Post Cl - 1 Cell)
  - PCC-9.02 Residuals Management Unit 2 (Post Cl - 2 Cells)
  - PCC-9.03 Residuals Management Unit 2 (Post Cl - 3 Cells)
  - PCC-9.04 Residuals Management Unit 2 (Post Cl - 4 Cells)
  - PCC-9.05 Residuals Management Unit (Post Cl - 5 Cells)
  - PCC-9.06 Residuals Management Unit 2 (Post Cl - 6 Cells)
- RMU-2 Engineering Report - Part 373 Permit Application, "RMU-2 Engineering Report" (November 2013)
- "RMU-2 Soil Excavation Monitoring and Management Plan and RMU-2 Corrective Action Plan", November 8, 2013
- "RMU-1 to RMU-2 Transition Plan", November 8, 2013

SITEWIDE AND RMU-2 CLOSURE AND POST CLOSURE

COST ESTIMATES

Table 1
Summary of Proposed Financial Assurance
Residuals Management Unit No. 2 Development
CWM Chemical Services, LLC
Model City Facility
Model City, New York

Closure Cost Estimate Summary

No.	Facility Activity Area	Proposed Total Cost: Base = 2010 Offsite Waste Disposal	Deflated Basic Option Total Cost: 2012	Notes
2.01	New Drum Management Building	$981,858	$1,018,634	Replaces 2.0 when existing DMB closed
4.01	Stabilization Area (Revised)	$1,155,461	$1,198,741	Replaces 4.0 when trailer parking closed and new trailer parking built
5.32	AWTS (Fac Pond 5 w/1 tk)	$3,752	$3,892	New
6.01	Fac Ponds (3& 1-2)	$9,236,773	$9,582,749	Replaces 6.0 Upon FP 8 completely closed
6.02	Fac Ponds (3 & 1-2 & New Fac 5)	$9,515,813	$9,872,241	Replaces 6.01 Upon Construction of FP 5
6.03	Fac Ponds (1-2 & New Fac 5)	$2,514,451	$2,608,633	Replaces 6.02 when Fac Pond 3 closed
8.01	CSA New Full Trail Parking (5 tankers)	$507,926	$526,952	Replaces 8.0 when South Trailer Parking Closed & New Parking Constructed
15.01	Residuals Management Unit - 2 (1 cell)	$4,810,069	$4,990,237	Financial Assurance Upon Construction of Cell 20
15.02	Residuals Management Unit - 2 (2 cells)	$10,330,917	$10,717,876	Replaces 15.01 Upon Construction of Cell 18
15.03	Residuals Management Unit - 2 (3 cells)	$11,505,630	$11,936,590	Replaces 15.02 Upon Construction of Cell 19
15.04	Residuals Management Unit - 2 (4 cells)	$12,439,038	$12,904,959	Replaces 15.03 Upon Construction of Cell 17
15.05	Residuals Management Unit - 2 (5 cells)	$15,203,934	$15,773,418	Replaces 15.04 Upon Construction of Cell 16
15.06	Residuals Management Unit - 2 (6 cells)	$15,928,417	$16,525,039	Replaces 15.05 Upon Construction of Cell 15

Post-Closure Cost Estimate Summary

No.	Facility Activity Area	30-Year Post Closure Costs: Proposed Post-Closure One Year Cost: Base = 2010	Est'd One Year Cost: Base 2012	Post Closure Period	Proposed 30-Year Post Closure Costs	Perpetual Care Costs: Perpetual Care Annual Costs Base = 2010	Perpetual Care Est'd One Year Cost: Base 2012	Approved Perpetual Care Discount Rate	Perpetual Care Monitoring Costs Base = 2012	Notes
PCC-9.01	Resid Mgmt Unit 2 (Post Cl - 1 Cell)	$30,781	$31,933	30	$958,003	$25,661	$26,623	3.85%	$691,494	Financial Assurance Upon Construction of Cell 20
PCC-9.02	Resid Mgmt Unit 2 (Post Cl - 2 Cells)	$49,836	$51,703	30	$1,551,083	$38,091	$39,518	3.85%	$1,026,438	Replaces PCC-9.01 Upon Construction of Cell 18
PCC-9.03	Resid Mgmt Unit 2 (Post Cl - 3 Cells)	$67,913	$70,457	30	$2,113,698	$55,712	$57,799	3.85%	$1,501,267	Replaces PCC-9.02 Upon Construction of Cell 19
PCC-9.04	Resid Mgmt Unit 2 (Post Cl - 4 Cells)	$78,636	$81,581	30	$2,447,439	$66,015	$68,487	3.85%	$1,778,896	Replaces PCC-9.03 Upon Construction of Cell 17
PCC-9.05	Resid Mgmt Unit 2 (Post Cl - 5 Cells)	$95,396	$98,969	30	$2,969,064	$82,312	$85,395	3.85%	$2,218,045	Replaces PCC-9.04 Upon Construction of Cell 16
PCC-9.06	Resid Mgmt Unit 2 (Post Cl - 6 Cells)	$127,652	$132,433	30	$3,972,994	$109,501	$113,602	3.85%	$2,950,710	Replaces PCC-9.05 Upon Construction of Cell 15

Notes: The proposed amount for Post-Closure Care shall be the greater of the 30 year Post-Closure Cost Estimate and the Perpetual Care Cost Estimate.

The US Department of Commerce - Bureau of Economic Analysis updated the National Income and Product Accounts Table 1.1.9. Implicit Price Deflators for Gross Domestic Product on November 1, 2013 for the year 2010-2012. An implicit deflator and an adjustment for inflation has been applied to the cost estimate.
http://www.bea.gov/

Implicit Price Deflators for Gross Domestic Product
2012 Rate =105.002 (2012 GDP) ÷ 101.211 (2010 GDP) = **1.03746**

2012	105.002
2011	103.199
2010	101.211

2.01 New Drum Management Building

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
2.01.0 Inventory Verification						production rate = two persons req'd @ average of two drums/minute/crew with a 10-min break/hour	
Laborer	40.9	hours	$39.00	$1,595	$1,595	4,088 drums @ 100 drums/hr = 40.9 hours	HASP req's two: loaded labor rate 2011 3rd party quote
Subtotal - Inventory Verification				**$1,595**	**$1,595**		
Subt: Assemblies 2.01.1)				**$1,595**	**$1,595**	*survey and inventory of maximum capacity of Drum Management Building*	
2.01.2 Load Solids Drms for O/S L'Fill						production rate = 80 drums/hour/person; Facility experience	
Laborer	76.8	hours	$39.00	$2,995	$2,995	3068 drums @ 80 drums/hr = 38.4 hours @ 2 units/crew = 76.8 hours	one forklift oper + one helper; rate 2011 3rd party quote
Forklift	38.4	hours	$22.21	$853	$853	3068 drums @ 80 drums/hr = 38.4 hours @ 1 units/crew = 38.4 hours	RSM/HC p. 470 (line item 01 54 33 40 2020)
Flatbed Trailer (40-ton)	38.4	hours	$6.26	$240	$240	3068 drums @ 80 drums/hr = 38.4 hours @ 1 units/crew = 38.4 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Load Drums for Onsite L'Fill				**$4,088**	**$4,088**		
2.01.3 Trans Solids Drms to O/S L'Fill						assumes on-site disposal	
Road Tractor (4 x 2, 30-ton)	19.2	hours	$32.45	$0	$623	3068 drums @ 80 drums/load = 38.4 loads @ 0.5 hr/load = 19.2 hours	RSM/HC p. 472 (line item 01 54 33 40 7410)
Driver	19.2	hours	$45.00	$0	$864	3068 drums @ 80 drums/load = 38.4 loads @ 0.5 hr/load = 19.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Flatbed Trailer (40-ton)	19.2	hours	$6.26	$0	$120	3068 drums @ 80 drums/load = 38.4 loads @ 0.5 hr/load = 19.2 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Transp Drms to Onsite L'Fill				**$0**	**$1,607**		
2.01.4 Unload Sol Drums at O/S L'Fill						assumes on-site disposal	
Laborer	19.2	hours	$39.00	$0	$749	3068 drums @ 80 drums/load = 38.4 loads @ 0.5 hr/load = 19.2 hours	one forklift oper + one helper; rate 2011 3rd party quote
Forklift	19.2	hours	$22.21	$0	$426	3068 drums @ 80 drums/load = 38.4 loads @ 0.5 hr/load = 19.2 hours	RSM/HC p. 470 (line item 01 54 33 40 2020)
Flatbed Trailer (40-ton)	19.2	hours	$6.26	$0	$120	3068 drums @ 80 drums/load = 38.4 loads @ 0.5 hr/load = 19.2 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Unload Drms at Onsite L'Fill				**$0**	**$1,295**		
2.01.5 Offsite Disp - Solids Drums						assumes off-site land disposal; 80 drms/load; Fac est assumes on-site disposal	
Offsite Transportation	14784	miles	$3.50	$51,744	$0	3068 drums @ 80 drums/ld = 38.4 loads @ 385 miles/trip = 14,784 miles	Rate: transporters quote/site experience
Offsite Disposal - Landfill	3068	drums	$100.00	$306,800	$0	3068 drums	HWC/ETC 2004 & CWM 2011 cost comparison industry pricing based on current market conditions
Subt - Offsite Disp - Solids Drums				**$358,544**	**$0**		
(Subt: Assemblies 2.01.2 thru 2.01.5)				**$362,632**	**$6,991**	*loading, off-site transporting, and off-site disposal of drummed solids*	
2.01.6 Load Drums for O/S Aque Trt						production rate = 80 drums/hour; facility experience	
Laborer	10.2	hours	$39.00	$398	$398	410 drums @ 80 drums/hr = 5.1 hours @ 2 units/crew = 10.2 hours	one forklift oper + one helper; rate 2011 3rd party quote
Forklift	5.1	hours	$22.21	$113	$113	410 drums @ 80 drums/hr = 5.1 hours @ 1 units/crew = 5.1 hours	RSM/HC p. 470 (line item 01 54 33 40 2020)
Flatbed Trailer (40-ton)	5.1	hours	$6.26	$32	$32	410 drums @ 80 drums/hr = 5.1 hours @ 1 units/crew = 5.1 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Load Drms for Onsite Aq/Tr				**$543**	**$543**		
2.01.7 Transp to O/S Aqueous Treat						production rate = 0.5 hours for onsite travel	
Road Tractor (4 x 2, 30-ton)	2.6	hours	$32.45	$84	$84	410 drums @ 80 drum/load = 5.1 loads @ = 0.5 hours/trip = 2.6 hours	RSM/HC p. 472 (line item 01 54 33 40 7410)
Driver	2.6	hours	$45.00	$117	$117	410 drums @ 80 drum/load = 5.1 loads @ = 0.5 hours/trip = 2.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Flatbed Trailer (40-ton)	2.6	hours	$6.26	$16	$16	410 drums @ 80 drum/load = 5.1 loads @ = 0.5 hours/trip = 2.6 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Transp to Onsite Aque Treat				**$218**	**$218**		

2.01 New Drum Management Building

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
2.01.8 Unload/Empty Drms:O/S AqTrt						production rate = 80 drm/hr; facility experience	
Laborer	10.2	hours	$39.00	$398	$398	410 drums @ 80 drums/hr = 5.1 hours @ 2 units/crew = 10.2 hours	one forklift oper + one helper; rate 2011 3rd party quote
Forklift	5.1	hours	$22.21	$113	$113	410 drums @ 80 drums/hr = 5.1 hours @ 1 units/crew = 5.1 hours	RSM/HC p. 470 (line item 01 54 33 40 2020)
Flatbed Trailer (40-ton)	5.1	hours	$6.26	$32	$32	410 drums @ 80 drums/hr = 5.1 hours @ 1 units/crew = 5.1 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Unl/Emp Drms: O/S Aqu Trt				**$543**	**$543**		
2.01.9 Onsite Aqueous Treatment							
Onsite Aqueous Treatment	22550	gal	$0.1526	$3,441	$3,441	410 drums @ 55 gal/drum = 22,550 gallons	On-site treatment costs: other (gate receipts) wastewater source
Subt - Onsite Aqueous Treatment				**$3,441**	**$3,441**		
(Subt: Assemblies 2.01.6 thru 2.01.9)				**$4,745**	**$4,745**	*loading, onsite transporting, unloading, and onsite disposal of drummed liquids*	
2.01.10 Load Org Liq Drms for Bulking						production rate = 80 drums/hour; facility experience	
Laborer	12.2	hours	$39.00	$476	$476	490 drums @ 80 drums/hr = 6.1 hours @ 2 units/crew = 12.2 hours	one forklift oper + one helper; rate 2011 3rd party quote
Forklift	6.1	hours	$22.21	$135	$135	490 drums @ 80 drums/hr = 6.1 hours @ 1 units/crew = 6.1 hours	RSM/HC p. 470 (line item 01 54 33 40 2020)
Flatbed Trailer (40-ton) not req'd	0	hours	$6.26	$0	$0	0 drums @ 80 drums/hr = 0.0 hours @ 1 units/crew = 0.0 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Load Org Liq Drms - Bulking				**$611**	**$611**		
2.01.11 Onsite Transportation						onsite bulking performed at Drum Management Building by forklift; no transportation costs incurred	
N/A	0	hours	$0.00	$0	$0	0 drums @ 80 drum/load = 0.0 loads @ 0.5 hours/trip = 0.0 hours	drums moved solely by forklift at Drum Mgmt Bldg
Subt - Onsite Transportation				**$0**	**$0**		
2.01.12 Unload Org Liq Drms/Bulking						production rate = 80 drums/hour; facility experience	
Laborer	12.2	hours	$39.00	$476	$476	490 drums @ 80 drums/hr = 6.1 hours @ 2 units/crew = 12.2 hours	one forklift oper + one helper; rate 2011 3rd party quote
Forklift	6.1	hours	$22.21	$135	$135	490 drums @ 80 drums/hr = 6.1 hours @ 1 units/crew = 6.1 hours	RSM/HC p. 470 (line item 01 54 33 40 2020)
Flatbed Trailer (40-ton) not req'd	0	hours	$6.26	$0	$0	0 drums @ 80 drums/hr = 0.0 hours @ 1 units/crew = 0.0 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Unload Org Liq Drms/Bulking				**$611**	**$611**		
2.01.13 Bulk Org Liquids into Tankers						prod'n rate = 5 min/drum; employs a 2-person crew + equipment	
Laborer	81.6	hours	$39.00	$3,182	$3,182	490 drums @ 12 drums/hr = 40.8 hours @ 2 units/crew = 81.6 hours	two laborers; rate 2011 3rd party quote
Pumping Equipment	40.8	hours	$71.47	$2,916	$2,916	490 drums @ 12 drums/hr = 40.8 hours @ 1 units/crew = 40.8 hours	RSM/UP p. 9-171 (line item 33-19-0108)
Tank Trailer - 5,500 Gallons	40.8	hours	$6.31	$257	$257	490 drums @ 12 drums/hr = 40.8 hours @ 1 units/crew = 40.8 hours	RSM/HC p. 472 (line item 01 54 33 40 6900)
Subt - Bulk Org Liq into Tankers				**$6,356**	**$6,356**		
(Subt: Assemblies 2.01.10 thru 2.01.13)				**$7,578**	**$7,578**	*loading, onsite transporting, and bulking drummed organic liquids*	

2.01 New Drum Management Building

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
2.01.14 Transp Org Liquids Offsite						capacity per 5,500-gal tanker = one hundred (100) 55-gal drums	
Transport in 5,500-gal Tankers	7492	miles	$3.50	$26,222	$26,222	490 drums @ 100 drm/tankr = 4.9 loads @ 1529 miles/trip = 7,492 miles	Rate: transporters quote/site experience
Subt - Transp Org Liquids Offsite				**$26,222**	**$26,222**		
2.01.15 Transp Ramp Liquids Offsite						two standing 5,500-gal tankers parked at West ramp = 11,000 gallons	
Transport two 5,500 Gal Tankers	3058	miles	$3.50	$10,703	$10,703	11000 gals @ 5500 gal/tankr = 2.0 loads @ 1529 miles/trip = 3058.0 miles	Rate: transporters quote/site experience
Subt - Transp Org Liquids Offsite				**$10,703**	**$10,703**		
2.01.16 Offsite Org Liquids Disposal						offsite incineration of non-PCB liquids	
Disposal Cost - Liquids (558 drums)	26950	gallons	$3.15	$84,893	$84,893	490 drums @ 55 gal/drum = 26950 gallons	HWC/ETC 2004 & Current third party rate
Disposal Cost - Liquids (2 Tankers)	11000	gallons	$3.15	$34,650	$34,650	2.0 tankr @ 5500 gal/tankr = 11000 gallons	HWC/ETC 2004 & Current third party rate
Subt - Offsite Org Liq Disposal				**$119,543**	**$119,543**		
(Subt: Assemblies 2.01.14 thru 2.01.16)				**$156,468**	**$156,468**	*offsite T&D of liquids*	
2.01.17 Incinerables From Transf. Rm.							
Empty Transformers						prod'n rate = 1,650 gals/hr; RSM/UP p. 9-171 (33-19-0101); 6 transformers @ 344.2 gals each	2,065 gal. from Transformer Flush Area
Laborer	2.6	hours	$39.00	$101	$101	2,065 gals @ 1650 gals/hr = 1.3 hours @ 2 units/crew 2.6 hours	two laborers; rate 2011 3rd party quote
Pumping Equipment	1.3	hours	$71.47	$93	$93	2,065 gals @ 1650 gals/hr = 1.3 hours @ 1 units/crew 1.3 hours	RSM/UP p. 9-171 (line item 33-19-0108)
Tank Trailer - 5,000 Gals	1.3	hours	$6.31	$8	$8	2,065 gals @ 1650 gals/hr = 1.3 hours @ 1 units/crew 1.3 hours	T&D rate below includes tanker
Subt - Empty Transformers				**$203**	**$203**		
2.01.18 Transp Transformer Liqs Offsite						capacity per tanker = 5 000 gallons capacity per tanker = 5,000 gallons	
Transport in 5,000 Gal Tanker	1529	miles	$3.50	$5,352	$5,352	2,065 gals @ 5000 gal/tankr = 0.4 loads (↑1.0)@ 1529 miles/load 1529.0 miles	Rate: transporters quote/site experience
Subt - Transp't Transformer Liquids				**$5,352**	**$5,352**		
2.01.19 Dispose of Transformer Liquids						liquid PCB wastes	
Disposal Cost - PCB Liquids	2065	gallons	$4.68	$9,664	$9,664	2,065 gallons	HWC/ETC 2004 & Current third party rate
Subt - Transformer O/S Liq Dispos'l				**$9,664**	**$9,664**		
(Subt: Assemblies 3.2 thru 3.4)				**$15,218**	**$15,218**	*empty transformers and T&D PCB liquids*	
2.01.20 Load Empty Drums						production rate = 160 drums/hour (double the rate of full drums)	
Laborer	11.2	hours	$39.00	$437	$437	900 drums @ 160 drums/hr = 5.6 hours @ 2 units/crew = 11.2 hours	one forklift oper + one helper; rate 2011 3rd party quote
Forklift	5.6	hours	$22.21	$124	$124	900 drums @ 160 drums/hr = 5.6 hours @ 1 units/crew = 5.6 hours	RSM/HC p. 470 (line item 01 54 33 40 2020)
Flatbed Trailer (40-ton)	5.6	hours	$6.26	$35	$35	900 drums @ 160 drums/hr = 5.6 hours @ 1 units/crew = 5.6 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Load Empty Drums				**$596**	**$596**	Loaded for on-site shredding & offsite disposal or for onsite disposal	
2.01.21 Transp Drums to Onsite Shrd						production rate = 0.5 hours for onsite travel	
Road Tractor (4 x 2, 30-ton)	5.7	hours	$32.45	$185	$0	900 drums @ 80 drum/load = 11.3 loads @ 0.5 hours/trip = 5.7 hours	RSM/HC p. 472 (line item 01 54 33 40 7410)
Driver	5.7	hours	$45.00	$257	$0	900 drums @ 80 drum/load = 11.3 loads @ 0.5 hours/trip = 5.7 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Flatbed Trailer (40-ton)	5.7	hours	$6.26	$36	$0	900 drums @ 80 drum/load = 11.3 loads @ 0.5 hours/trip = 5.7 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Transp to Onsite Shredder				**$477**	**$0**		

2.01 New Drum Management Building

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
2.01.22 Unload Empty Drums						production rate = 160 drums/hour (double the rate of full drums)	
Laborer	11.2	hours	$39.00	$437	$0	900 drums @ 160 drums/hr = 5.6 hours @ 2 units/crew = 11.2 hours	one forklift oper + one helper; rate 2011 3rd party quote
Forklift	5.6	hours	$22.21	$124	$0	900 drums @ 160 drums/hr = 5.6 hours @ 1 units/crew = 5.6 hours	RSM/HC p. 470 (line item 01 54 33 40 2020)
Flatbed Trailer (40-ton)	5.6	hours	$6.26	$35	$0	900 drums @ 160 drums/hr = 5.6 hours @ 1 units/crew = 5.6 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Unload Empty Drums				**$596**	**$0**		
2.01.23 Onsite Drum Shredding						prod'n = 80 drums/hour; debris shredded into rolloff	
Laborer	22.6	hours	$39.00	$881	$0	900 drums @ 80 drums/hr = 11.3 hours @ 2 units/crew = 22.6 hours	one shredder oper + one helper; rate 2011 3rd party quote
Shredder	11.3	hours	$329.70	$3,726	$0	900 drums @ 80 drums/hr = 11.3 hours @ 1 units/crew = 11.3 hours	2004 DEC Rate * Implicit Deflator
Rolloff (30-CY)	11.3	hours	$19.02	$215	$0	900 drums @ 80 drums/hr = 11.3 hours @ 1 units/crew = 11.3 hours	dumpster RSM/BC p. 42 (02225-730-0800)
Subt - Onsite Drum Shredding				**$4,822**	**$0**		
2.01.24 Transp Drms: onsite L'fill						Transport whole drums to onsite landfill for disposal: production rate = 0.5 hours for onsite travel	
Road Tractor (4 x 2, 30-ton)	5.6	hours	$32.45	$0	$182	900 drums @ 80 drums/load = 11.3 loads @ 0.5 hours/trip = 5.6 hours	RSM/HC p. 472 (line item 01 54 33 40 7410)
Driver	5.6	hours	$45.00	$0	$252	900 drums @ 80 drums/load = 11.3 loads @ 0.5 hours/trip = 5.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Flatbed Trailer (40-ton)	5.6	hours	$6.26	$0	$35	900 drums @ 80 drums/load = 11.3 loads @ 0.5 hours/trip = 5.6 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Transp Mat'l to Landfill				**$0**	**$469**	Drums crushed in landfill	
2.01.25 Unload Empty Drum						prod'n rate = 160 drums/hour (assume double the rate of full drums @ site experience)	
Laborer	5.6	hours	$39.00	$0	$218	900 drums @ 160 drums/hr = 5.6 hours @ 1 units/crew = 5.6 hours	one loader oper + one helper; rate 2011 3rd party quote
Loader (medium)	5.6	hours	$14.39	$0	$81	900 drums @ 160 drums/hr = 5.6 hours @ 1 units/crew = 5.6 hours	RSM/HC p. 468 (line item 01 54 33 20 4610)
Flatbed Trailer (40-ton)	5.6	hours	$6.26	$0	$35	900 drums @ 160 drums/hr = 5.6 hours @ 1 units/crew = 5.6 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Unload Epty Drum at Landfill				**$0**	**$334**	Drums crushed in landfill	
2.01.26 Offsite Disp/Shrd'd Drums						assumes off-site land disposal of shredded drums; 20 tons/load	
Offsite Transportation	5.0	miles	$3.25	$16	$0	9 tons @ 20 tons/load = 0.5 (↑1) loads @ 5 miles/trip = 5.0 miles	Rate: transporters quote/site experience
Offsite Disposal - Non-Haz Landfill	10.3	tons	$35.00	$361	$0	900 drums @ 20 lbs/drum = 9 tons @ 1 tons/CY = 9 tons	Modern Disposal/Site Experience
Subt - Offsite Shrd'd Drums Disp'l				**$377**	**$0**		
(Subt: Assemblies 2.01.20 thru 2.01.26)				**$6,868**	**$1,399**	*onsite drum shredding and off-site non-haz disposal*	

2.01.27 Load Spec Treat for O/S T&D						production rate = 40 drums/hour; site experience	
Laborer	6	hours	$39.00	$234	$234	120 drums @ 40 drums/hr = 3.0 hours @ 2 pers/crew = 6.0 hours	one forklift oper + one helper; rate 2011 3rd party quote
Forklift	3	hours	$22.21	$67	$67	120 drums @ 40 drums/hr = 3.0 hours @ 1 units/crew = 3.0 hours	RSM/HC p. 470 (line item 01 54 33 40 2020)
Dump Trailer (22 ton)	3	hours	$5.20	$16	$16	120 drums @ 40 drums/hr = 3.0 hours @ 1 units/crew = 3.0 hours	RSM/HC p. 469 (line item 01 54 33 20 5400)
Subt - Load Spec Trt for O/S T&D				**$316**	**$316**		
2.01.28 Transport Spec Trt Offsite						Estimate based on a per drum basis for special treatment waste: max 120 drums	
Truck Transport @ 88 drums/load	0	miles	$0.00	$0	$0		
Transport per drum	120	drum	$50.00	$6,000	$6,000	Facility estimate based on per drum rate	rate = site experience
Subt - Transport Spec Trt Offsite				**$6,000**	**$6,000**		

2.01 New Drum Management Building

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
2.01.29 Offsite Spec Trt Disposal						disposal price of $500/drum	
Disposal Cost (Misc Drums)	120	drum	$500.00	$60,000	$60,000	120 drums	site estimate of $500/drum for unknown wastes
Subt - Offsite Spec Trt Disposal				**$60,000**	**$60,000**		
(Subt: Assemblies 2.01.27 thru 2.01.29)				**$66,316**	**$66,316**	*offsite T&D of drums requiring special treatment*	
2.01.30 Decon Drm Mgmt Bldg (wash)						production rate = 105 SF/hr for 1-person crew w/ one unit each; facility experience	47,557 = Areas 1-9 + fuels pump area & Bladder tank area
Laborer	452.9	hours	$39.00	$17,663	$17,663	47,557 SF @ 105 SF/hr = 452.9 hours @ 1 pers/crew = 452.9 hours	two laborers-1 unit each; rate 2011 3rd party quote
Pressure Washer		hours	$4.04	$0	$0	Vacuum-Pressure Wash Combo Used	RSM/HC p. 471 (line item 01 54 33 40 5450)
Vacuum Sweeper		hours	$3.41	$0	$0	not required	RSM/HC p. 473 (line item 01 54 33 40 7800)
Vacuum-Pressure Wash Combo	452.9	hours	$22.94	$10,390	$10,390	47,557 SF @ 105 SF/hr = 452.9 hours @ 1 units/crew = 452.9 hours	2001 Rate * Implicit Deflator
Subt - Decon Drm Mgt Bldg (Wash)				**$28,053**	**$28,053**		
2.01.31 Decon Drum Mgt Bldg (Rinse)						production rate = 105 SF/hr for 1-person crew w/ one unit; facility experience	
Laborer	905.8	hours	$39.00	$35,326	$35,326	47,557 SF @ 105 SF/hr = 452.9 hours @ 2 pers/crew = 905.8 hours	two laborers-1 unit each; rate 2011 3rd party quote
Pressure Washer		hours	$4.04	$0	$0	Vacuum-Pressure Wash Combo Used	RSM/HC p. 471 (line item 01 54 33 40 5450)
Vacuum Sweeper		hours	$3.41	$0	$0	not required	RSM/HC p. 473 (line item 01 54 33 40 7800)
Vacuum-Pressure Wash Combo	452.9	hours	$22.94	$10,390	$10,390	47,557 SF @ 105 SF/hr = 452.9 hours @ 1 units/crew = 452.9 hours	2001 Rate * Implicit Deflator
Subt - Decon Drm Mgt Bldg (Rinse)				**$45,716**	**$45,716**		
2.01.32 Decon Water Samp/Dispose						production rate = 0.5 hours/sample for two techs; DEC treatment unit price = $0.1042/gallon	
Technician	8.0	hours	$38.00	$304	$304	8 samp @ 0.5 hr/samp = 4 hours @ 2 pers/crew = 8 hours	rate 2011 3rd party quote
VOC Analysis (EPA 624)	8.0	samp	$105.00	$840	$840	8 samples	analytical price: average of three quotes
On-site Water Disposal	4,755.80	gal	$0.0313	$149	$149	47,557 SF @ 0.05 gal/sf/wa = 2,377.9 gal 0.05 gal/sf/rinse = 2,377.9 gals	site waters waste treat price ; vol @ 0.05 gal/sf (equip lit)
Subt - Decon Water Samp/Dispose				**$1,293**	**$1,293**		
2.01.33 PCB Wipe & Destruct Samp						production rate = 0.5 hours/sample for two techs based upon facility exp	
Technician	79	hours	$38.00	$3,002	$3,002	79 samp @ 0.5 hr/samp = 39.5 hours @ 2 pers/crew = 79 hours	technician rate 2011 3rd party quote
TCLP (Metals/VOCs/Semi-VOCs)	0	samp	$446.67	$0	$0	concrete core samples and TCLP not required - permit	analytical price: average of three quotes
PCB Analysis (SW 8081/8082)	79	samp	$83.33	$6,583	$6,583	47,557 SF @ 625 SF/samp + 1 dup/20 samp. = 79 samples	analytical price: average of three quotes
Subt - PCB Wipe/Destruct Samp				**$9,585**	**$9,585**		
(Subt: Assemblies 2.01.30 thru 2.01.33)				**$84,646**	**$84,646**	*building decontamination and sampling*	

Total Labor Hours 1801.3

2.01 New Drum Management Building

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
2.01.34 PPE Usage & H&S Planning						Level C @ 75%; Mod Level C @ 25% for total non-supv hrs for all tasks; HASP @ 2.5% of non-supv hrs	
PPE Usage - Mod Level C	56.3	days	$9.00	$507	$507	1,801.3 hours @ 8 hr/day = 225.2 days @ 25% "Mod C" days = 56.3 days	25% of non-supv hrs in Mod Level C (price: $9/day)
PPE Usage - Level C	168.9	days	$25.00	$4,223	$4,223	1,801.3 hours @ 8 hr/day = 225.2 days @ 75% "C" days = 168.9 days	75% of non-supv hrs in Level C (price: $25/day)
Safety Engineer	45	hours	$75.00	$3,375	$3,375	1,801.3 hours @ 2.5% hr/hr = 45 hours	Safety Eng Rate: rate 2011 3rd party quote
Subt - PPE Usage/H&S Planning				**$8,104**	**$8,104**		
2.01.35 Supervision						4 weeks for closure of Drum Management Building	
Foreman	160	hours	$65.00	$10,400	$10,400	4 weeks @ 40 hrs/wk = 160.0 hours	Outside foreman rate: 2011 3rd party quote
Site Project Manager	0	hours	$75.00	$0	$0	Included in Gen'l Contractor G&A/Home Office indirect costs	Site Manager Rate: 2011 3rd party quote
Subtotal - Supervision				**$10,400**	**$10,400**		
2.01.36 Certification						Engineer @ 1.5% and Clerical @ 1.5% of total non-supervisory hours for all tasks	
Engineer	27	hours	$130.00	$3,510	$3,510	1,801.3 hours @ 0.015 hr/hr = 27 hours	Engineer rate: 2011 3rd party quote
Clerical	27	hours	$45.00	$1,215	$1,215	1,801.3 hours @ 0.015 hr/hr = 27 hours	Clerical rate: 2011 3rd party quote
Subtotal - Certification				**$4,725**	**$4,725**		
(Subt: Assemblies 2.01.34 thru 2.01.36)				**$23,229**	**$23,229**	*supervision, health & safety, and certification*	

2.01 New Drum Mgmt Bldg	**Direct Cost**	**Total**	**Basic**	**$714,078**	**$352,968**

2.01 New Drum Management Building **Total Cost Summary**			
Cost Category	**Proposed Percent** **of Direct Cost**	**Proposed 2011 Cost OffSite Disposal**	**Cost Range**
Direct Costs/Basic Disposal		$714,078	
Plus Indirect Costs/Profit:			
Site Activity Management Costs	7.00%	$49,985	note: DEC uses 7%
Gen'l Contractor G&A/Home Office	4.00%	$28,563	note: DEC uses 4%
Pre-Construction Design Costs	6.00%	$42,845	note: DEC uses 6%
Engineering During Construction	2.00%	$14,282	note: DEC uses 2%
General Contractor Profit	6.00%	$42,845	Note DEC adds 6%
Indirect Costs/Basic Disposal	25.00%	$178,520	
Subtotal - Drum Storage Bldg		$892,598	
Plus Contingency	10.00%	$89,260	CWM and DEC 10%
Total - New Drum Management Bldg		**$981,858**	

Cost References:
"RSM/HC" refers to the RSMeans "Heavy Construction Cost Data", 2009 Edition (rates adjusted for inflation)
"RSM/UP" refers to the RSMeans "Environmental Remediation Cost Data - Unit Price", 2004 Edition (rates adjusted for inflation)
"RSM/BC" refers to the RSMeans "Building Construction Cost Data", 2003 Edition (rates adjusted for inflation)

4.01 New Stabilization 11 Tankers

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References

	Inventory
RCRA Solids – Shredder/Landfill	300 drums/75 cu. yds.
RCRA Solids - Stab/Landfill	48 rolloffs/1152 tons
RCRA Solids - Macro/Landfill	18 rolloffs/288 tons
PCB Liquids - Incineration	11 tankers/27,500 gals

4.01.1 Inventory Verification						prod'n rates: 2 drums/min/crew (100 drums/hour); and 8 tanker or rolloff/hour/crew; two persons required;	
Laborer	6	hours	$39.00	$234	$234	300 drums @ 100 drums/hr = 3.0 hours @ 2 units/crew = 6.0 hours	HASP req's two; loaded labor rate 2011 3rd party quote
Laborer	16.5	hours	$39.00	$644	$644	66 rolloffs @ 8 rolloffs/hr = 8.25 hours @ 2 units/crew = 16.5 hours	HASP req's two; loaded labor rate 2011 3rd party quote
Laborer	5.5	hours	$39.00	$215	$215	11 tankers @ 4 tankers/hr = 2.75 hours @ 2 units/crew = 5.5 hours	HASP req's two; loaded labor rate 2011 3rd party quote
Subtotal - Inventory Verification				**$1,092**	**$1,092**		
(Subt: Assemblies 4.01.1)				**$1,092**	**$1,092**	*survey and inventory of capacity of Stabilization area*	

4.01.2 Transp All Rolloffs: Onsite Stab for Offsite disp						production rate = 0.5 hours/rolloff for on-site travel (all rolloffs previouslyexisting at site)	
Road Tractor (4 x 2, 30-ton)	24.0	hours	$32.45	$779	$0	48 rolloffs @ 1 rolloff/load = 48 loads @ 0.5 hours/trip = 24 hours	RSM/HC p. 472 (line item 01 54 33 40 7410)
Driver	24.0	hours	$45.00	$1,080	$0	48 rolloffs @ 1 rolloff/load = 48 loads @ 0.5 hours/trip = 24 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Rolloff (30-CY) (existing equip't)	0	hours	$19.02	$0	$0	0 rolloffs @ 1 rolloff/load = 0.0 loads @ 0.5 hours/trip = 0.0 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subtotal -Transport Rolloffs Onsite				**$1,859**	**$0**		
4.01.3 Transp All Rolloffs: Onsite Stab for Onsite disp						production rate = 0.5 hours/rolloff for on-site travel (all rolloffs previouslyexisting at site)	
Road Tractor (4 x 2, 30-ton)	27.0	hours	$32.45	$0	$876	48 rolloffs @ 1 rolloff/load = 54 loads @ 0.5 hours/trip = 24 hours	RSM/HC p. 472 (line item 01 54 33 40 7410)
Driver	27.0	hours	$45.00	$0	$1,215	48 rolloffs @ 1 rolloff/load = 54 loads @ 0.5 hours/trip = 24 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Rolloff (30-CY) (existing equip't)	0	hours	$19.02	$0	$0	0 rolloffs @ 1 rolloff/load = 0.0 loads @ 0.5 hours/trip = 0.0 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subtotal -Transport Rolloffs Onsite				**$0**	**$2,091**		
4.01.4 Stabilization (non-Macro mat'l) for Offsite disp						prod'n rate = 100 tons/hour = 800 tons/day (non-Macro Room material); 30 CY roll = 16 tons	
PROCESS TONS (incl kiln dust)	883.2	*TONS*	*n/a*			48 rolloffs @ 30 CY each @ 16 tons/rolloff + 15% kiln dust = 883.2 tons	30 CY/rolloff = 16 ton material/rolloff
Cement Kiln Dust - Mat'l&Delv Cost	115.2	tons	$48.00	$5,530	$0	48 rolloffs @ 30 CY each @ 16 tons/rolloff + 15% kiln dust = 883.2 tons	CWM actual 2011 costs
Stabilization Cost	768.0	tons	$25.00	$19,200	$0	Facility combined rate for material & delivery	CWM actual 2011 costs inc. labor & equipment
TCLP Testing - RCRA (EPA 1311)	16.0	samp	$348.33	$5,573	$0	48 rolloffs @ 3 ro's/samp = 16 samples	average of 3 third party labs; one sample per 3 rolloffs
Subt - Stabilization				**$30,303**	**$0**	Facility include in stabilization rate; inc. labor & equipment	
4.01.5 Stabilization (non-Macro mat'l) for Onsite disp						prod'n rate = 100 tons/hour = 800 tons/day (non-Macro Room material); 30 CY roll = 16 tons	
PROCESS TONS (incl kiln dust)	883.2	*TONS*	*n/a*			48 rolloffs @ 30 CY each @ 16 tons/rolloff + 15% kiln dust = 883.2 tons	30 CY/rolloff = 16 ton material/rolloff
Cement Kiln Dust - Mat'l&Delv Cost	115.2	tons	$48.00	$0	$5,530	48 rolloffs @ 30 CY each @ 16 tons/rolloff + 15% kiln dust = 883.2 tons	CWM actual 2011 costs
Stabilization Cost	768.0	tons	$25.00	$0	$19,200	Facility combined rate for material & delivery	CWM actual 2011 costs inc. labor & equipment
TCLP Testing - RCRA (EPA 1311)	16.0	samp	$348.33	$0	$5,573	48 rolloffs @ 3 ro's/samp = 16 samples	average of 3 third party labs; one sample per 3 rolloffs
Subt - Stabilization				**$0**	**$30,303**	Facility include in stabilization rate; inc. labor & equipment	

4.01 New Stabilization 11 Tankers

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
4.01.6 Load non-Macro Rolloffs						facility include in stabilization cost	
Laborer	0	hours	$39.00	$0	$0	Not required	loaded labor rate: loaded labor rate 2011 3rd party quote
Backhoe (1 CY)	0	hours	$19.18	$0	$0		RSM/HC p. 467 (line item 01 54 33 20 0460)
Equipment Operator (Medium)	0	hours	$45.00	$0	$0		loaded labor rate: loaded labor rate 2011 3rd party quote
Rolloff (30-CY) (existing equip't)	0	hours	$19.02	$0	$0		dumpster RSM/BC p. 42 (02225-730-0800)
Subt - Load non-Macro Rolloffs				**$0**	**$0**		
4.01.7 Transp Rolloffs to Onsite L'fill						production rate = 0.25 hours for onsite travel	
Road Tractor (4 x 2, 30-ton)	12.0	hours	$32.45	$0	$389	48 rolloffs @ 1 rolloff/load = 48 loads @ 0.25 hours/trip = 12 hours	RSM/HC p. 472 (line item 01 54 33 40 7410)
Driver	12.0	hours	$45.00	$0	$540	48 rolloffs @ 1 rolloff/load = 48 loads @ 0.25 hours/trip = 12 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Subt - Transp RO's to Onsite Landfill				**$0**	**$929**	Assembly estimate assumes on-site disposal	
4.01.8 Unload non-Macro Rolloffs						production rate = 0.25 hours for unload in landfill	
Laborer	12.0	hours	$39.00	$0	$468	48 rolloffs @ 1 rolloff/load = 48 loads @ 0.25 hours/trip = 12 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Backhoe (1 CY)	12.0	hours	$19.18	$0	$230	48 rolloffs @ 1 rolloff/load = 48 loads @ 0.25 hours/trip = 12 hours	RSM/HC p. 467 (line item 01 54 33 20 0460)
Equipment Operator (Medium)	12.0	hours	$45.00	$0	$540	48 rolloffs @ 1 rolloff/load = 48 loads @ 0.25 hours/trip = 12 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Rolloff (30-CY) (existing equip't)	0	hours	$19.02	$0	$0		dumpster RSM/BC p. 42 (02225-730-0800)
Subt - Unload RO's at Onsite L'Fill				**$0**	**$1,238**	Assembly estimate assumes on-site disposal	
4.01.9 Offsite Landfill Disp/Solids						assumes off-site land disposal; 54 roll-offs	
Offsite Transportation - Solids	21252.0	miles	$3.25	$69,069	$0	883.2 tons @ 16 tons/load = 55.2 loads @ 385 miles/trip = 21,252 miles	Rate: transporters quote/site experience
Offsite Disp - Haz Rolloff Solids	883.2	tons	$133.00	$117,466	$0	48 rolloffs @ 30 CY each @ 16 tons/rolloff + 15% kiln dust = 883.2 tons	HWC/ETC 2004 & CWM 2011 cost comparison industry pricing based on current market conditions
Subt - Off-site Landfill/non-Macro				**$186,535**	**$0**		
4.01.10 Stab n/Encap n (Macro mat'l)						production rate = 40 tons/hour = 320 tons/day (Macro material): for onsite disposal	
PROCESS TONS (incl kiln dust)	419.2	TONS				18 rolloffs @ 30 CY each @ 0.675 ton/CY + 15% absorbent = 419.2 tons	1 CY = 1,350# (0.675 ton) @ 50# per CF for "loose" mat'l
Laborer	41.9	hours	$39.00	$1,634	$0	419.2 tons @ 40 tons/hr @ 10.5 hours @ 4 units/crew = 41.9 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	21	hours	$50.00	$1,050	$0	419.2 tons @ 40 tons/hr @ 10.5 hours @ 2 units/crew = 21.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Backhoe (1 CY)	10.5	hours	$19.18	$201	$0	419.2 tons @ 40 tons/hr @ 10.5 hours @ 1 units/crew = 10.5 hours	RSM/HC p. 467 (line item 01 54 33 20 0460)
Loader (Medium)	10.5	hours	$14.39	$151	$0	419.2 tons @ 40 tons/hr @ 10.5 hours @ 1 units/crew = 10.5 hours	RSM/HC p. 468 (line item 01 54 33 20 4610)
Absorbent Additive	81	CY	$38.70	$3,135	$0	18 rolloffs @ 30 CY each @ 15% additive = 81 CY	2004 DEC Rate * Implicit Deflator
Encapsulation Container	18.0	units	$1,000.00	$18,000	$0	18.0 units	CWM actual 2011 costs
Rolloff (30-CY) (not used)	0.0	units	$19.02	$0	$0	0.0 units	dumpster RSM/BC p. 42 (02225-730-0800)
Subt - Stab'n/Encap'n - Macro Mat'l				**$24,171**	**$0**		
4.01.11 Transp Macro Encap'n Onsite						production rate = 0.5 hours for onsite travel	
Road Tractor (4 x 2, 30-ton)	9.0	hours	$32.45	$0	$292	18 rolloffs @ 1 rolloff/load = 18.0 loads @ 0.5 hours/trip = 9.0 hours	RSM/HC p. 472 (line item 01 54 33 40 7410)
Driver	9.0	hours	$45.00	$0	$405	18 rolloffs @ 1 rolloff/load = 18.0 loads @ 0.5 hours/trip = 9.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Rolloff (30-CY) (existing equip't)	0	hours	$19.02	$0	$0		RSM/HC p. 472 (line item 01 54 33 40 6600)
Subtotal - Transp Macro Encap'n				**$0**	**$697**	Assembly estimate assumes on-site disposal	

4.01 New Stabilization 11 Tankers

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
4.01.12 Offsite Macro Encap'n						assumes off-site land disposal; 18 macro-encap. conts. on-site disposal	
Offsite Transp'n - Encap Containers	6930.0	miles	$3.25	$22,523	$0	18.0 contain @ 1 cont/load = 18.0 loads @ 385 miles/trip = 6930.0 miles	Rate: transporters quote/site experience
Offsite Disposal - Encap Containers	510.0	CY	$337.50	$172,125	$0	18.0 contain @ 30 CY/cont = 510.0 CY	DEC 2004 Estimate accounting for inflation
Subt - Offsite Landfill Disp/Solids				**$194,648**	**$0**		
(Subt: Assemblies 4.01.2 thru 4.01.12)				**$437,515**	**$35,259**	*onsite stabilization and offsite or onsite disposal of all Macro Room material*	
4.01.13 Shred Drums with Contents						Shredding of drums not necessary. Drums transported direct to onsite landfill or offsite landfill	
Laborer	0	hours	$39.00	$0	$0		loaded labor rate: loaded labor rate 2011 3rd party quote
Drum Shredder	0	hours	$329.70	$0	$0		2004 DEC Rate * Implicit Deflator
Rolloff (30-CY)	0	hours	$19.02	$0	$0		RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Load Drums for Offsite L'fill				**$0**	**$0**		
4.01.14 Load Full Solids Drums						production rate = 80 drums/hour/person; Facility experience	
Laborer	3.8	hours	$39.00	$0	$148	300 drums @ 80 drums/hr = 3.8 loads @ 2 units/crew = 3.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Forklift	1.9	hours	$22.21	$0	$42	300 drums @ 80 drums/hr = 3.8 loads @ 1 units/crew = 1.9 hours	RSM/HC p. 470 (line item 01 54 33 40 2020)
Flatbed Trailer (40-ton)	1.9	hours	$6.26	$0	$12	300 drums @ 80 drums/hr = 3.8 loads @ 1 units/crew = 1.9 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Load PCB Sol Drms to L'Fill				**$0**	**$202**		
4.01.15 Transp Full Drms: onsite L'fill						Assumes onsite land disposal; 0.5 hr per load to onsite landfill	
Road Tractor (4 x 2, 30-ton)	1.9	hours	$32.45	$0	$62	300 drums @ 80 drums/load = 3.8 loads @ 0.5 hr/load = 1.9 hours	RSM/HC p. 472 (line item 01 54 33 40 7410)
Driver	1.9	hours	$45.00	$0	$86	300 drums @ 80 drums/load = 3.8 loads @ 0.5 hr/load = 1.9 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Flatbed Trailer (40-ton)	1.9	hours	$6.26	$0	$12	300 drums @ 80 drums/load = 3.8 loads @ 0.5 hr/load = 1.9 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Shrd Drms to Onsite Landfill				**$0**	**$159**		
4.01.16 Unload Full Drms: onsite L'fill						assumes on-site disposal: production rate = 80 drums/hour/person; Facility experience	
Laborer	3.8	hours	$39.00	$0	$148	300 drums @ 80 drums/hr = 3.8 loads @ 2 units/crew = 3.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Forklift	1.9	hours	$22.21	$0	$42	300 drums @ 80 drums/hr = 3.8 loads @ 1 units/crew = 1.9 hours	RSM/HC p. 470 (line item 01 54 33 40 2020)
Flatbed Trailer (40-ton)	1.9	hours	$6.26	$0	$12	300 drums @ 80 drums/hr = 3.8 loads @ 1 units/crew = 1.9 hours	RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Unload Full Drums				**$0**	**$202**		
4.01.17 Offsite Disp Full Drums						assumes off-site land disposal; volume based on 4 drums/CY (+ drum contents)	
Offsite Transp'n - Drum Mat'l	1463.0	miles	$3.50	$5,121	$0	300 drums @ 80 drums/ld = 3.8 loads @ 385 miles/trip = 1463.0 miles	Rate: transporters quote/site experience
Offsite Disposal - Drum Mat'l	300	drums	$100.00	$30,000	$0	300 drums	HWC/ETC 2004 & CWM 2011 cost comparison industry pricing based on current market conditions
Subt - Offsite L/F Disp: Full Drums				**$35,121**	**$0**	disposal of 300 drums with contents from drum shred area	
(Subt: Assemblies 4.01.13 thru 4.01.17)				**$35,121**	**$564**		
4.01.18 Offsite T&D - Tankers						eleven 2,500-gal existing tankers loaded and parked at stabilization parking area	
Offsite Transp'n - 5.5K-gal Tankers	16819.0	miles	$3.50	$58,867	$58,867	11 tankers @ 1529 miles/load = 16819 miles	Rate: transporters quote/site experience
Off-site Disp - Incin Bulk PCB Liqs	27500.0	gallons	$4.68	$128,700	$128,700	11 tankers @ 2500 gals/tankr = 27500.0 gals	HWC/ETC 2004 & Current third party rate
Subt - Offsite T&D - Tankers				**$187,567**	**$187,567**	offsite transportation and disposal of 5 five-thousand gallon tankers from stabilization area	
(Subt: Assemblies 4.01.18)				**$187,567**	**$187,567**		

4.01 New Stabilization 11 Tankers

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
4.01.19 Decon Equipment						prod'n rate = 52.5 SF/hr (1/2 of RSM/UP p. 9-167, 33-17-0813, as wash & rinse are combined)	
Reagent Silo/Hopper	19.0	hours	$121.50	$2,309	$2,309	2 units @ 500 SF each = 1000.0 SF @ 52.5 SF/hour = 19.0 hours	2004 DEC Rate * Implicit Deflator
Control Room	19.0	hours	$121.50	$2,309	$2,309	1 units @ 1000 SF each = 1000.0 SF @ 52.5 SF/hour = 19.0 hours	assume 20' x 10' x 10' (L x W x H)
Air Compressor/Ancillary Equip't	1.9	hours	$121.50	$231	$231	1 units @ 100 SF each = 100.0 SF @ 52.5 SF/hour = 1.9 hours	assume 100 SF
Hydraulic Skid/Ancillary Equip't	14.3	hours	$121.50	$1,737	$1,737	1 units @ 750 SF each = 750.0 SF @ 52.5 SF/hour = 14.3 hours	assume 750 SF
Drum Shredder	0.0	hours	$121.50	$0	$0	Drum Shredder cleaned and removed 2009	
Knuckle Boom	9.5	hours	$121.50	$1,154	$1,154	1 units @ 500 SF each = 500.0 SF @ 52.5 SF/hour = 9.5 hours	assume 500 SF
Backhoe	1.9	hours	$121.50	$231	$231	1 units @ 100 SF each = 100.0 SF @ 52.5 SF/hour = 1.9 hours	assume 100 SF
Subt - Decon Equip't (wash & rinse)				**$7,970**	**$7,970**	7 units 3450.0 SF total	
4.01.20 Decon Water Samp/Dispose						production rate = 0.5 hours/sample for two techs; facility treatment unit price = $0.0273/gallon	
Technician	7.7	hours	$38.00	$293	$293	7.7 samp @ 0.5 hr/samp = 3.8 hours @ 2 units/crew = 7.7 hours	technician rate: rate 2011 3rd party quote
VOC Analysis (EPA 624)	7.7	samp	$105.00	$809	$809	7.0 units @ 1.1 samp/unit = 7.7 samples	analytical price: average of three quotes
Onsite Water Disposal	3150.0	gal	$0.0313	$99	$99	3450.0 SF @ 0.5 gal/sf/wa = 2100.0 gallons + 0.25 gal/sf/rinse = 1050.0 gallons	facility o/s mild waste treat price ; vol @ 0.05 gal/sf (equip lit)
Subt - Decon Water Samp/Dispose				**$1,200**	**$1,200**		
4.01.21 PCB Wipe Samples						production rate = 0.5 hours/sample for two techs; rate same as facility's	
Technician	7.7	hours	$38.00	$293	$293	7.7 samp @ 0.5 hr/samp = 3.8 hours @ 2 units/crew = 7.7 hours	technician rate: rate 2011 3rd party quote
PCB Analysis/Wipe Test (SW 8081/8082)	7.7	samp	$83.33	$642	$642	7.0 units @ 1.1 samp/unit = 7.7 samples	analytical price: average of three quotes
Subt - Wipe Samples				**$934**	**$934**		
4.01.22 Dismant/Load Equipment						prod'n rate = 150 SF/hr (based upon removing one 20K-gal tank in 8 hrs: 1,225 SF div. by 8 = 153 sf)	
Laborer	46.0	hours	$39.00	$1,794	$1,794	3450 SF @ 150 SF/hour 23.0 hours 2 units/crew = 46.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Welding Equipment (300 amp towable)	23.0	hours	$4.90	$113	$113	3450 SF @ 150 SF/hour 23.0 hours 1 units/crew = 23.0 hours	RSM/HC p. 473 (line item 01 54 33 40 7800)
Yard Crane (25-ton)	23.0	hours	$86.31	$1,985	$1,985	3450 SF @ 150 SF/hour 23.0 hours 1 units/crew = 23.0 hours	RSM/HC p. 474 (line item 01 54 33 60 2700)
Equipment Operator (Crane)	23.0	hours	$50.00	$1,150	$1,150	3450 SF @ 150 SF/hour 23.0 hours 1 units/crew = 23.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Subt - Dismantle Equipment				**$5,042**	**$5,042**		
(Subt: Assemblies 4.01.19 thru 4.01.22)				**$15,146**	**$15,146**	*decontaminating and dismantling Equipment*	

4.01 New Stabilization 11 Tankers

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
4.01.23 Demo/Load/Trans Ducts/Bagh						prod'n rates: 125 LF/hr (ductwork) = 7 days; four days/unit (baghouses) = 32 days; total = 39 days	
Dismantle/Cut/Load Ductwork	7040.0	LF	$2.14	$15,066	$15,066	7040 LF @ 3 SF/LF = 21120.0 SF @ 0.021 CF/SF = 16.4 CY	2004 DEC Rate * Implicit Deflator
Dismantle/Cut/Load Baghouses	8.0	each	$7,340.17	$58,721	$58,721	8 units @ 2500 SF/unit = 20000.0 SF @ 0.021 CF/SF = 15.6 CY	2001 Rate * Implicit Deflator
Subt - Dismantle Ducts/Baghouses				**$73,787**	**$73,787**		
4.01.24 Unload/Stabilize/Encapsulate						production rate = 15 tons/hour = 120 tons/day; includes shredding and filling containers	
PROCESS TONS (incl kiln dust)	37.2	*TONS*				32.0 CY @ 1.0125 ton/CY + 15% kiln dust = 37.2 tons	1 CY = 2,025# (1.0125 ton) @ 75# per CF
Laborer	5.0	hours	$39.00	$195	$195	37.2 tons @ 15 tons/hr @ 2.5 hours @ 2 units/crew = 5.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	7.4	hours	$45.00	$333	$333	37.2 tons @ 15 tons/hr @ 2.5 hours @ 3 units/crew = 7.4 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Backhoe (1 CY)	2.5	hours	$19.18	$48	$48	37.2 tons @ 15 tons/hr @ 2.5 hours @ 1 units/crew = 2.5 hours	RSM/HC p. 467 (line item 01 54 33 20 0460)
Loader, Wheel (1 CY)	2.5	hours	$14.39	$36	$36	37.2 tons @ 15 tons/hr @ 2.5 hours @ 1 units/crew = 2.5 hours	RSM/HC p. 468 (line item 01 54 33 20 4610)
Shredder	2.5	hours	$329.70	$824	$824	37.2 tons @ 15 tons/hr @ 2.5 hours @ 1 units/crew = 2.5 hours	2004 DEC Rate * Implicit Deflator
Mixing Pit/Screening/Silo	2.5	hours	$136.29	$341	$341	37.2 tons @ 15 tons/hr @ 2.5 hours @ 1 units/crew = 2 5 hours	2004 DEC Rate * Implicit Deflator
Cement Kiln Dust - Mat'l Cost	0.0	tons	$0.00	$0	$0	32.0 CY @ 1.0125 ton/CY @ 15% kiln dust = 4.9 tons	
Cement Kiln Dust - Delivery Cost	0.0	loads	$0.00	$0	$0	4.9 tons @ 20 ton/load = 0.2 loads	
Cement Kiln Dust - Mat'l&Delv Cost	4.9	tons	$48.00	$235	$235		CWM actual 2011 costs
Encapsulation Containers	2.0	units	$1,000.00	$2,000	$2,000	37.2 tons @ 18.6 ton/unit = 2.0 containers	CWM actual 2011 costs
Rolloffs (30-CY)	5.0	hours	$19.02	$95	$95	37.2 tons @ 18.6 tons/unit = 2.0 rolloffs @ 2.5 hours/rolloff = 5.0 hours	dumpster RSM/BC p. 42 (02225-730-0800)
Subt - Stabilize/Encapsulate				**$4,107**	**$4,107**		
4.01.25 Transp Encap Units onsite L'F						production rate = 0.5 hours for onsite travel	
Road Tractor (4 x 2, 30-ton)	1.0	hours	$32.45	$0	$32	2 rolloffs @ 1 rolloff/load = 2.0 loads @ 0.5 hours/trip = 1.0 hours	RSM/HC p. 472 (line item 01 54 33 40 7410)
Driver	1.0	hours	$45.00	$0	$45	2 rolloffs @ 1 rolloff/load = 2.0 loads @ 0.5 hours/trip = 1.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Rolloff (30-CY) (existing equip't)	0.0	hours	$19.02	$0	$0		RSM/HC p. 472 (line item 01 54 33 40 6600)
Subt - Shrd Drms to Onsite Landfill				**$0**	**$77**	Transport to onsite landfill for disposal	
4.01.26 Offsite Disp/Bghouse-Duct						assumes off-site disposal; 2 macro-encap cont.; stabilized/encap. Baghouse debris	
Offsite Transp - Baghouse/Duct	770.0	miles	$3.25	$2,503	$0	37.2 tons @ 18.6 tons/load = 2.0 loads @ 385 miles/trip = 770.0 miles	Rate: transporters quote/site experience
Offsite Disp'l - Baghouse/Duct Deb	36.8	CY	$337.50	$12,420	$0	37.2 tons @ 1.013 tons/CY = 36.8 CY @ 27 CF/CY = 993.0 CF	DEC 2004 Estimate accounting for inflation
Subt - Offsite B'house/Duct Disp'l				**$14,923**	**$0**		
(Subt: Assemblies 4.01.23 thru 4.01.26)				**$92,817**	**$77,972**	*demolition, stabilization, encapsulation, and off-site disposal of ductwork and baghouses*	
4.01.27 Decon Stab'n Areas (wash)						production rate = 105 SF/hr for 1-person crew w/ one unit each; facility experience	
Laborer	580.3	hours	$39.00	$22,632	$22,632	60934 SF @ 105 SF/hr = 580.3 hours @ 1 units/crew = 580.3 hours	two laborers-1 unit each; rate 2011 3rd party quote
Pressure Washer	396.4	hours	$4.04	$1,601	$1,601	41619 SF @ 105 SF/hr = 396.4 hours @ 1 units/crew = 396.4 hours	RSM/HC p. 471 (line item 01 54 33 40 5450)
Vacuum Sweeper	0.0	hours	$0.83	$0	$0		RSM/HC p. 473 (line item 01 54 33 40 7800)
Vacuum-Pressure Wash Combo	184	hours	$22.94	$4,221	$4,221	19315 SF @ 105 SF/hr = 184 hours @ 1 units/crew = 184 hours	equip't price: average of three quotes
Subt - Decon Stab'n Areas (wash)				**$28,453**	**$28,453**	Pressure wash containment areas, walls, pits, & vacuum-pressure wash floors	
4.01.28 Decon Stab'n Areas (rinse)						production rate = 105 SF/hr for 1-person crew w/ one unit each; facility experience	
Laborer	184	hours	$39.00	$7,176	$7,176	19315 SF @ 105 SF/hr = 184 hours @ 1 units/crew = 184 hours	two laborers-1 unit each; rate 2011 3rd party quote
Pressure Washer	0.0	hours	$4.04	$0	$0		RSM/HC p. 471 (line item 01 54 33 40 5450)
Vacuum Sweeper	0.0	hours	$0.83	$0	$0		RSM/HC p. 473 (line item 01 54 33 40 7800)
Vacuum-Pressure Wash Combo	184	hours	$22.94	$4,221	$4,221	19315 SF @ 105 SF/hr = 184 hours @ 1 units/crew = 184 hours	equip't price: average of three quotes
Subt - Decon Stab'n Areas (rinse)				**$11,397**	**$11,397**	Rinse floor areas only	

4.01 New Stabilization 11 Tankers

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
4.01.29 Decon Water Samp/Dispose						production rate = 0.5 hours/sample for two techs;	
Technician	13.2	hours	$38.00	$502	$502	13.2 samp @ 0.5 hr/samp = 6.6 hours @ 2 units/crew 13.2 hours	technician rate: rate 2011 3rd party quote
VOC Analysis (EPA 624)	13.2	samp	$105.00	$1,386	$1,386	12.0 areas @ 1.1 samp/area = 13.2 samples	analytical price: average of three quotes
On-site Water Disposal (wash only)	20809.5	gal	$0.0313	$651	$651	41619 SF @ 0.5 gal/sf/wa = 20809.5 gallons	site waters waste treat price ; vol @ 0.5 gal/sf (equip lit)
On-site Water Disposal (wash-rinse)	965.8	gal	$0.0313	$30	$30	19315 SF @ 0.05 gal/sf/wa = 965.8 gallons + 0.05 gal/sf/rinse= 965.8 gallons	site waters waste treat price ; vol @ 0.05 gal/sf (equip lit)
Subt - Decon Water Samp/Dispose				**$2,569**	**$2,569**		
4.01.30 PCB Wipe & Destruct Samp						production rate 0.5 hours/sample for two techs; rate same as facility's	
Technician	75.4	hours	$38.00	$2,865	$2,865	74.4 samp @ 0.5 hr/samp = 37.7 hours @ 2 units/crew = 75.4 hours	technician rate: rate 2011 3rd party quote
TCLP (Metals/VOCs/Semi-VOCs)	2.0	samp	$446.67	$893	$893	2.0 areas @ 1 samp/area = 2.0 samples Uncoated concrete areas	analytical price: average of three quotes
PCB Analysis (SW 8081/8082)	75.4	samp	$83.33	$6,283	$6,283	47129.0 SF @ 625 SF/samp = 75.4 samples	analytical price: average of three quotes
Subt - PCB Wipe/Destruct Samp				**$10,042**	**$10,042**		
(Subt: Assemblies 4.01.27 thru 4.01.30)				**$52,461**	**$52,461**	*decontamination & sampling of floors, sumps, and pits*	

Total Non-Super hours 1151.8

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
4.01.31 PPE Usage & H&S Planning						Level C @ 75%; Mod Level C @ 25% for tot non-supv hrs for all tasks; HASP @ 2.5% of non-supv hrs	
PPE Usage - Mod Level C	36.1	days	$9.00	$325	$325	1151.8 hours @ 8 hr/day = 144.0 days @ 25% "Mod C" days = 36.0 days	25% of non-supv hrs in Mod Level C (price: $9/day)
PPE Usage - Level C	108.2	days	$25.00	$2,705	$2,705	1151.8 hours @ 8 hr/day = 144.0 days @ 75% "C" days = 108.0 days	75% of non-supv hrs in Level C (price: $25/day)
Health & Safety Officer	28.8	hours	$75.00	$2,160	$2,160	1151.8 hours @ 2.5% hr/hr = 28.8 hours	Safety Eng Rate: rate 2011 3rd party quote
Subt - PPE Usage/H&S Planning				**$5,190**	**$5,190**		
4.01.32 Supervision						4 weeks for closure of Stabilization	
Foreman	160	hours	$65.00	$10,400	$10,400	4 weeks @ 40 hrs/wk = 160.0 hours	Outside foreman rate: 2011 3rd party quote
Site Project Manager	0	hours	$75.00	$0	$0	Included in Gen'l Contractor G&A/Home Office indirect costs	Site Manager Rate: 2011 3rd party quote
Subtotal - Supervision				**$10,400**	**$10,400**		
4.01.33 Certification						Engineer @ 1.5% and Clerical @ 1.5% of total non-supervisory labor hours for all tasks	
Engineer	17.3	hours	$130.00	$2,249	$2,249	1151.8 hours @ 0.015 hr/hr = 17.3 hours	Engineer rate: 2011 3rd party quote
Clerical	17.3	hours	$45.00	$779	$779	1151.8 hours @ 0.015 hr/hr = 17.3 hours	Clerical rate: 2011 3rd party quote
Subtotal - Certification				**$3,028**	**$3,028**		
(Subt: Assemblies 4.01.31 thru 4.01.33)				**$18,617**	**$18,617**	*supervision, health & safety, and certification*	
4.01 New Stabilization 11 Tankers	**Direct Cost**	**Total**	**Basic**	**$840,335**	**$388,677**		

4.01 New Stabilization 11 Tankers

Total Cost Summary

Cost Category	**Proposed Percent of Direct Cost**	**Proposed 2011 Cost OffSite Disposal**	**Cost Range**
Direct Costs/Basic Disposal		$840,335	
Plus Indirect Costs/Profit:			
Site Activity Management Costs	7.00%	$58,823	note: DEC uses 7%
Gen'l Contractor G&A/Home Office	4.00%	$33,613	note: DEC uses 4%
Pre-Construction Design Costs	6.00%	$50,420	note: DEC uses 6%
Engineering During Construction	2.00%	$16,807	note: DEC uses 2%
General Contractor Profit	6.00%	$50,420	Note DEC adds 6%
Indirect Costs/Basic Disposal	25.00%	$210,084	
Subtotal - Stabilization Activity		$1,050,419	
Plus Contingency	10.00%	$105,042	CWM and DEC 10%
Total - New Stabilization		**$1,155,461**	

Cost References:
"RSM/HC" refers to the RSMeans "Heavy Construction Cost Data", 2009 Edition (rates adjusted for inflation)
"RSM/UP" refers to the RSMeans "Environmental Remediation Cost Data - Unit Price", 2004 Edition (rates adjusted for inflation)
"RSM/BC" refers to the RSMeans "Building Construction Cost Data", 2003 Edition (rates adjusted for inflation)

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Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
5.32.1 Inventory Verification					prod'n rates: 50 drums/hr; 15 min/tanker or rolloff; 30 min/tank; two persons required	
Laborer	1.0	hours	$39.00	$39	1 tanks @ 0.5 hour/tank = 0.5 hours @ 2 units/crew = 1.0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
Subtotal - Inventory Verification				**$39**		
(Subt: Assemb 5.32.1)				**$39**	tank: T-9002	
5.32.2 Empty Tank T-9002					production rate = 1,650 gals/hour; RSM/UP p. 9-171 (line item 33-19-0101)	
Laborer	0.0	hours	$39.00	$0	Labor included in third party operation of AWTS	loaded labor rate: loaded labor rate 2011 3rd party quote
Pumping Equipment	0.0	hours	$0.00	$0	Existing equipment part of tank system	RSM/UP p. 9-171 (line item 33-19-0108)
Tank Trailer (5,500 gals)	0.6	hours	$6.31	$4	1000 gals @ 1650 gals/hr = 0.6 hours @ 1 units/crew = 0.6 hours	RSM/HC p. 472 (line item 01 54 33 40 6900)
Subt - Empty Tank				**$4**		
5.32.3 Onsite Tanker Transport					production rate = 0.5 hours/trip for onsite transport	
Tractor	0.1	hours	$32.45	$3	1000 gals @ 5500 gals/load = 0.2 loads @ 0.5 hrs/trip = 0.1 hours	RSM/HC p. 472 (line item 01 54 33 40 7410)
Driver	0.0	hours	$45.00	$0	Labor included in third party operation of AWTS	loaded labor rate: loaded labor rate 2011 3rd party quote
Tank Trailer (5,500 gals)	0.1	hours	$6.31	$1	1000 gals @ 5500 gals/load = 0.2 loads @ 0.5 hrs/trip = 0.1 hours	RSM/HC p. 472 (line item 01 54 33 40 6900)
Subt - Onsite Tanker Transport				**$4**		
5.32.4 Empty Tanker					production rate = 1,650 gals/hour; RSM/UP p. 9-171 (line item 33-19-0101)	
Laborer	0.0	hours	$39.00	$0	Labor included in third party operation of AWTS	loaded labor rate: loaded labor rate 2011 3rd party quote
Pumping Equipment	0.0	hours	$0.00	$0	Existing equipment part of tank system	RSM/UP p. 9-171 (line item 33-19-0108)
Tank Trailer (5,500 gals)	0.6	hours	$6.31	$4	1000 gals @ 1650 gals/hr = 0.6 hours @ 1 units/crew = 0.6 hours	RSM/HC p. 472 (line item 01 54 33 40 6900)
Subt - Empty Tanker				**$4**		
(Subt: Assemb 5.32.2 - 5.32.4)				**$11**		
5.32.5 Onsite Aqueous Treatment					liquid wastes transferred to AWTS by tankers	
Onsite Aqueous Treatment - Tanks	1000.0	gals	$0.1526	$153	1000 gals	AWTS cost for groundwater
Subt - Onsite Aqueous Treatment				**$153**		
(Subt: Assemb 5.32.5)				**$153**	*onsite treatment of tanks' waste liquids*	
5.32.6 Steel SCA Demolition					prod'n rate = 200 SF/hr (rsm/up 16-01-0142/0216/0308, pp. 3-2/3-3,3-5); 1 CF debris per 36 sf sc area	
No. of Tanks/Capacity/Area/Weight	0.0	*tnks @*			*0 gallons: 90 SF SCA: 3 CF @ 490 Lb/CF = 1225 Lbs*	*Steel Tanks only; estimate 490#/CF*
Laborer	0.0	hours	$39.00	$0	0 SF @ 200 SF/hour 0.5 hours @ 3 units/crew = 0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	0.0	hours	$45.00	$0	0 SF @ 200 SF/hour 0.5 hours @ 2 units/crew = 0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Excavator	0.0	hours	$84.09	$0	0 SF @ 200 SF/hour 0.5 hours @ 1 units/crew = 0 hours	RSM/HC p. 467 (line item 01 54 33 20 0320)
Metal Shears Attachment	0.0	hours	$34.40	$0	0 SF @ 200 SF/hour 0.5 hours @ 1 units/crew = 0 hours	2004 DEC Rate * Implicit Deflator
Claw Attachment	0.0	hours	$2.47	$0	0 SF @ 200 SF/hour 0.5 hours @ 1 units/crew = 0 hours	RSM/HC p. 477 (line item 01 54 33 20 0345)
Loader	0.0	hours	$30.03	$0	0 SF @ 200 SF/hour 0.5 hours @ 1 units/crew = 0 hours	RSM/HC p. 469 (line item 01 54 33 20 4730)
Yard Crane	0.0	hours	$86.31	$0	0 SF @ 200 SF/hour 0.5 hours @ 1 units/crew = 0 hours	RSM/HC p. 474 (line item 01 54 33 60 2700)
Welding Equipment	0.0	hours	$5.41	$0	0 SF @ 200 SF/hour 0.5 hours @ 1 units/crew = 0 hours	RSM/HC p. 473 (line item 01 54 33 40 7800)
Subt - Steel SCA Demolition				**$0**	T-9002 is a double walled HDPE tank. No steel demolition will be required.	

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Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
5.32.7 HDPE Tank Demolition					production rate = 200 SF/hour (same as steel tank demolition rate); 1 CF debris per 36 SF tank area	168 SF Tank & 178 SF Secondary Containment
No. of Tanks/Capacity/Area/Weight	1.0	*tnks @*			1000 *gallons:* 346 *SF Tanks:* 9.6 *CF @* *245 Lb/CF =* 2354 *Lbs*	HDPE *Tanks & HDPLE Secondary Containment*
Laborer	5.2	hours	$39.00	$203	346 SF @ 200 SF/hour 1.7 hours @ 3 units/crew = 5.2 hours	HASP req's two: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	3.5	hours	$45.00	$158	346 SF @ 200 SF/hour 1.7 hours @ 2 units/crew = 3.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Excavator	1.7	hours	$84.09	$143	346 SF @ 200 SF/hour 1.7 hours @ 1 units/crew = 1.7 hours	RSM/HC p. 467 (line item 01 54 33 20 0320)
Metal Shears Attachment	1.7	hours	$34.40	$58	346 SF @ 200 SF/hour 1.7 hours @ 1 units/crew = 1.7 hours	2004 DEC Rate * Implicit Deflator
Claw Attachment	1.7	hours	$2.47	$4	346 SF @ 200 SF/hour 1.7 hours @ 1 units/crew = 1.7 hours	RSM/HC p. 477 (line item 01 54 33 20 0345)
Loader	1.7	hours	$30.03	$51	346 SF @ 200 SF/hour 1.7 hours @ 1 units/crew = 1.7 hours	RSM/HC p. 469 (line item 01 54 33 20 4730)
Yard Crane	1.7	hours	$86.31	$147	346 SF @ 200 SF/hour 1.7 hours @ 1 units/crew = 1.7 hours	RSM/HC p. 474 (line item 01 54 33 60 2700)
Welding Equipment	0.0	hours	$5.41	$0	346 SF @ 200 SF/hour 1.7 hours @ 0 units/crew = 0.0 hours	RSM/HC p. 473 (line item 01 54 33 40 7800)
Subt - HDPE Tank Demolition				**$764**	*tank areas based upon actual tank dimensions, or upon OSWER 9476.00-6, Vol 3, p. 5-5*	
5.32.8 Tank Piping Demolition					avg prod'n rate = 20 LF/hr, rsm/up p. 3-10 (16-01-0621/0622) for 2"/4" metal pipe @ 4#/LF	
Estimated Piping Length	100.0	*LF*			*1 tanks @* *100 LF/tank =* *100 LF @* *4 Lb/LF =* *400 Lbs*	*combined Steel and HDPE Tanks' Piping*
Laborers	10.0	hours	$39.00	$390	100 LF @ 20 LF/hour 5.0 hours @ 2 units/crew = 10.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Welding Equipment	5.0	hours	$5.41	$27	100 LF @ 20 LF/hour 5.0 hours @ 1 units/crew = 5.0 hours	RSM/HC p. 473 (line item 01 54 33 40 7800)
Subt - All Tanks' Piping Demolition				**$417**	*piping assumed to average 100 LF/tank*	
5.32.9 Tank Pump Demolition					prod'n rate = 1 pump/hr (see RSM/UP p. 3-11, 16-01-0634 and 16-01-0636) assume 0.5 pumps/tank	
Laborers	1.0	hours	$39.00	$39	0.5 pumps @ 1 pump/hr 0.5 hours @ 2 units/crew = 1.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Welding Equipment	0.5	hours	$5.41	$3	0.5 pumps @ 1 pump/hr 0.5 hours @ 1 units/crew = 0.5 hours	RSM/HC p. 473 (line item 01 54 33 40 7800)
Subt - All Tanks' Pump Demolition				**$42**	*pump weight = 250# each; one pump per tank is estimated*	
5.32.10 Load Tank Demo Debris					production rate = 15 CY/hour; RSM/BC p. 42 (line item 02225-730-3080)	
Laborer	0.06	hours	$39.00	$2	1.0 CY @ 15 CY/hr = 0.06 hours @ 1 units/crew 0.06 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	0.06	hours	$45.00	$3	1.0 CY @ 15 CY/hr = 0.06 hours @ 1 units/crew = 0.06 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Loader	0.06	hours	$30.03	$2	1.0 CY @ 15 CY/hr = 0.06 hours @ 1 units/crew = 0.06 hours	RSM/HC p. 469 (line item 01 54 33 20 4730)
Dump Trailer (20 CY)	0.06	hours	$5.20	$0	1.0 CY @ 15 CY/hr = 0.06 hours @ 1 units/crew 0.06 hours	RSM/HC p. 469 (line item 01 54 33 20 5400)
Subt - Load Tank Demo Debris				**$7**	*1 CY tank demo debris = to 972 SF @ 1/3rd" thick; and/or 432 LF of 3" diam pipe; and/or 2 pumps*	
5.32.11 Unl'd Stabilize/Encapsulate					prod rate = 15 tons/hour = 120 tons/day; includes unloading, shredding, and filling containers	
PROCESS TONS (incl kiln dust)	1.3	*TONS*			1.0 CY debr + 15% kiln dust = 1.15 CY total total tonnage = 1.9 tons	total tons derived from foregoing assemblies + kiln dust
Laborer	0.2	hours	$39.00	$8	1.9 tons @ 15 tons/hr @ 0.1 hours @ 2 units/crew = 0.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	0.3	hours	$45.00	$14	1.3 tons @ 15 tons/hr @ 0.1 hours @ 3 units/crew = 0.3 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Backhoe (1 CY)	0.1	hours	$19.18	$2	1.3 tons @ 15 tons/hr @ 0.1 hours @ 1 units/crew = 0.1 hours	RSM/HC p. 467 (line item 01 54 33 20 0460)
Loader, Wheel (1 CY)	0.1	hours	$14.39	$1	1.3 tons @ 15 tons/hr @ 0.1 hours @ 1 units/crew = 0.1 hours	RSM/HC p. 468 (line item 01 54 33 20 4610)
Shredder	0.1	hours	$329.70	$33	1.3 tons @ 15 tons/hr @ 0.1 hours @ 1 units/crew = 0.1 hours	2004 DEC Rate * Implicit Deflator
Mixing Pit/Screening/Silo	0.1	hours	$136.29	$14	1.3 tons @ 15 tons/hr @ 0.1 hours @ 1 units/crew = 0.1 hours	2004 DEC Rate * Implicit Deflator
Cement Kiln Dust - Mat'l Cost	0.0	tons	$0.00	$0	0.3 tons	
Cement Kiln Dust - Delivery Cost	0.0	loads	$0.00	$0	0.3 tons @ 20 ton/load = 0.0 loads	
Cement Kiln Dust - Mat'l&Delv Cost	0.3	tons	$48.00	$14		CWM actual 2011 costs
Encapsulation Containers (30-CY)	0.03	units	$1,000.00	$30	1.15 CYs @ 30 CY/unit = 0.03 containers	CWM actual 2011 costs
Rolloffs (30-CY)	0.03	hours	$19.02	$1	1.15 CYs @ 30 CY/unit = 0.04 rolloffs @ 0.1 hours/rolloff = 0.03 hours	dumpster RSM/BC p. 42 (02225-730-0800)
Subt - Stabilize/Encapsulate				**$116**	*1 CY tank demo debris = to 972 SF @ 1/3rd" thick; and/or 432 LF of 3" diam pipe; and/or 2 pumps*	

5.32 AWTS Fac 5 1 tk

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
5.32.12 Offsite T&D - Tank Demo					offsite disposal is determined to be the only disposal option	
Offsite Transportation - Debris	38.5	miles	$3.25	$125	1.15 CY @ 30 CY/load = 0.03 loads @ 385 miles/trip = 38.5 miles	Rate: transporters quote/site experience
Offsite Disposal - Tank Debris	1.15	CY	$337.50	$388	1.15 CY @ 27 CF/CY = 31.1 CF	DEC 2004 Estimate accounting for inflation
Subt - Offsite T&D - Tank Demo				**$513**		
(Subt: Assemb 5.32.6 - 5.32.12)				**$1,859**	*tank/piping/pump demolition, and offsite transportation & disposal*	
5.32.13 Decon SCA (wash)					not applicable - secondary containmnent demolished with primary tank	
Subt - Decon SCA (wash)				**$0**		
5.32.14 Decon SCA (rinse)						
Subt - Decon SCA (rinse)				**$0**		
5.32.15 Decon Water Samp/Disp						
Subt - Decon Water Samp/Dispose				**$0**		
5.32.16 PCB Wipe Samples						
Subt - PCB Wipe/Destruct Samp				**$0**		
(Subt: Assemb 5.32.13 - 5.32.16)				**$0**	*decontamination & sampling of SCA*	

Total Non-Super Labor Hours 21.3

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
5.32.17 PPE Usage/H&S Planning					Level C @ 75%; Mod Level C @ 25% for tot non-supv hrs for all tasks; HASP @ 2.5% of non-supv hrs	
PPE Usage - Level D	0.0	days	$0.00	$0	21.3 hours @ 8 hr/day = 2.7 days @ 0% "D" days = 0.0 days	Standard Work Clothes - Site Experience
	0.7	days	$9.00	$6	21.3 hours @ 8 hr/day = 2.7 days @ 25% "Mod C" days = 0.7 days	25% of non-supv hrs in Mod Level C (price: $9/day)
PPE Usage - Level C	2.0	days	$25.00	$50	21.3 hours @ 8 hr/day = 2.7 days @ 75% "C" days = 2.0 days	75% of non-supv hrs in Level C (price: $25/day)
Safety Engineer	0.5	hours	$75.00	$38	21.3 hours @ 2.5% hr/hr = 0.5 hours	Safety Eng Rate: rate 2011 3rd party quote
Subt - PPE Usage/H&S Planning				**$94**		
5.32.18 Supervision					0.2 weeks supervisory time for closure of 1 tank	
Foreman	8.0	hours	$65.00	$520	0.2 weeks @ 40 hrs/wk = 8.0 hours	Outside foreman rate: 2011 3rd party quote
Site Project manager	0.0	hours	$75.00	$0	Included in Gen'l Contractor G&A/Home Office indirect costs	Site Manager Rate: 2011 3rd party quote
Subtotal - Supervision				**$520**		
5.32.19 Certification					Engineer @ 1.5% and Clerical @ 1.5% of total non-supervisory hours for all tasks	
Engineer	0.3	hours	$130.00	$39	21.3 hours @ 0.015 hr/hr = 0.3 hours	Engineer rate: 2011 3rd party quote
Clerical	0.3	hours	$45.00	$14	21.3 hours @ 0.015 hr/hr = 0.3 hours	Clerical rate: 2011 3rd party quote
Subtotal -Certification				**$53**		
(Subt: Assemb 5.32.17 - 5.32.19)				**$666**		

5.32 AWTS Fac 5 1 tk	**Direct Cost**	**Total**	**Basic**	**$2,728**

5.32 AWTS (FacPond 5) 1 tk **Total Cost Summary**			
Cost Category	**Proposed Percent of Direct Cost**	**Proposed 2011 Cost**	**Cost Range**
Direct Costs/Basic Disposal		$2,728	
Plus Indirect Costs/Profit:			
Site Activity Management Costs	7.00%	$191	note: DEC uses 7%
Gen'l Contractor G&A/Home Office	4.00%	$109	note: DEC uses 4%
Pre-Construction Design Costs	6.00%	$164	note: DEC uses 6%
Engineering During Construction	2.00%	$55	note: DEC uses 2%
General Contractor Profit	6.00%	$164	Note DEC adds 6%
Indirect Costs/Basic Disposal	25.00%	$682	
Subt: AWTS (i/s A sou Full Trailer) 1 t		$3,411	
Plus Contingency	10.00%	$341	CWM and DEC 10%
Tot: AWTS (Fac Pond 5) 1 tk		**$3,752**	

Cost References:
"RSM/HC" refers to the RSMeans "Heavy Construction Cost Data", 2009 Edition (rates adjusted for inflation)
"RSM/UP" refers to the RSMeans "Environmental Remediation Cost Data - Unit Price", 2004 Edition (rates adjusted for inflation)
"RSM/BC" refers to the RSMeans "Building Construction Cost Data", 2003 Edition (rates adjusted for inflation)

6.01 Fac Ponds (3&1-2)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.01.1 Inventory Verification						production rate: 0.5 hour/pond to take depth estimate and estimate volume; two persons required	
Laborer	2.0	hours	$39.00	$78	$78	2 ponds @ 0.5 hr/pond = 1.0 hours @ 2 units/crew = 2.0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
Subtotal - Inventory Verification				**$78**	**$78**	Fac Pond 8 out of service and empty	
(Subt: Assemblies 6.01.1 thru 6.01.1)				**$78**	**$78**	*inventory of liquid volumes in Ponds 1/2 and Pond 3*	
6.01.2 Ponds' Sampling & Analysis						production rate = 2.0 hours per composite sample for a three-person crew	
Batch Sampling Events						2 *events @* 3 *samp/evnt=* 6 *samples*	sampling & analysis prior to pond discharge
Technician	36.0	hours	$38.00	$1,368	$1,368	6 samps @ 2.0 hrs/samp = 12.0 hours @ 3 units/crew = 36.0 hours	technician rate: rate 2011 3rd party quote
Sampling Equipment	12.0	hours	$25.00	$300	$300	6 samps @ 2.0 hrs/samp = 12.0 hours @ 1 units/crew = 12.0 hours	boat, samplers, meters, etc.
Sampling Supplies	6.0	samp	$25.00	$150	$150	6 samples	bottles, shipping supplies
pH	6.0	samp	$10.67	$64	$64	6 samples	analytical price: average of three quotes
Specific Conductance	6.0	samp	$13.33	$80	$80	6 samples	analytical price: average of three quotes
Temperature	6.0	samp	-	$0	$0	6 samples obtained using field equipment	Obtained using field equipment
Dissolved Oxygen	6.0	samp	-	$0	$0	6 samples obtained using field equipment	Obtained using field equipment
Total Dissolved solids (TDS)	6.0	samp	$15.00	$90	$90	6 samples	analytical price: average of three quotes
TDVS (total dissolved volatile solids)	6.0	samp	$23.33	$140	$140	6 samples	analytical price: average of three quotes
Alkalinity as CaCO3	6.0	samp	$15.33	$92	$92	6 samples	analytical price: average of three quotes
TOC	6.0	samp	$31.67	$190	$190	6 samples	analytical price: average of three quotes
Ca/Mg Hardness (200.7)	6.0	samp	$24.33	$146	$146	6 samples	analytical price: average of three quotes
Total Suspended Solids (TSS)	6.0	samp	$13.33	$80	$80	6 samples	analytical price: average of three quotes
Settleable Solids	6.0	samp	$13.33	$80	$80	6 samples	analytical price: average of three quotes
Ammonia (NH3)	6.0	samp	$22.67	$136	$136	6 samples	analytical price: average of three quotes
Phosphorous	6.0	samp	$20.00	$120	$120	6 samples	analytical price: average of three quotes
TON (TKN-NH3)	6.0	samp	$41.67	$250	$250	6 samples	analytical price: average of three quotes
Cyanide	6.0	samp	$35.00	$210	$210	6 samples	analytical price: average of three quotes
Sulfates	6.0	samp	$21.00	$126	$126	6 samples	analytical price: average of three quotes
Sulfides	6.0	samp	$25.00	$150	$150	6 samples	analytical price: average of three quotes
Surfactants (MBAS)	6.0	samp	$28.33	$170	$170	6 samples	analytical price: average of three quotes
BOD-5	6.0	samp	$30.00	$180	$180	6 samples	analytical price: average of three quotes
Fluoride	6.0	samp	$19.33	$116	$116	6 samples	analytical price: average of three quotes
Chlorine	6.0	samp	$19.33	$116	$116	6 samples	analytical price: average of three quotes
Residual Chlorine	6.0	samp	$15.00	$90	$90	6 samples	analytical price: average of three quotes
NO2	6.0	samp	$21.00	$126	$126	6 samples	analytical price: average of three quotes
NO3	6.0	samp	$19.33	$116	$116	6 samples	analytical price: average of three quotes
VOCs (624)	6.0	samp	$105.00	$630	$630	6 samples	analytical price: average of three quotes
Semi-volatile organics (625)	6.0	samp	$208.33	$1,250	$1,250	6 samples	analytical price: average of three quotes
Pesticides/PCBs (608) (MDL 65 PPT (ng/l))	6.0	samp	$133.33	$800	$800	6 samples	analytical price: average of three quotes
Oil & Grease (1631)	6.0	samp	$21.67	$130	$130	6 samples	analytical price: average of three quotes
total Phenols	6.0	samp	$26.67	$160	$160	6 samples	analytical price: average of three quotes
Priority Pollutant Metals (200.7) *	6.0	samp	$188.00	$1,128	$1,128	6 samples	analytical price: average of three quotes
Mercury (245.1)	6.0	samp	$25.00	$150	$150	6 samples	analytical price: average of three quotes
Mercury (1631B)	6.0	samp	$111.67	$670	$670	6 samples	analytical price: average of three quotes
Acute Toxicity/Bioassy	2.0	samp	$3,800.00	$7,600	$7,600	2 samples	One quote: actual cost for 2010
Subt - Ponds' Sampling & Analysis				**$17,204**	**$17,204**	*two pond discharges (batches) requiring sampling & analysis (Fac Pond 8 empty)*	Fac Pond 8 out of service empty

6.01 Fac Ponds (3&1-2)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.01.3 S&A Certification & Report						one event per year for divers to check discharge pipe; two 40-hour predischarge qualification reports	
Divers (Sr. Technicians)	0.0	hours	$0.00	$0	$0	Included in underwater inspection below	
SCBA Gear (2 units)	0.0	hours	$0.00	$0	$0	Included in underwater inspection below	
Laborer (Surface Support)	0.0	hours	$0.00	$0	$0	Included in underwater inspection below	
Underwater Inspection	1.0	each	$4,000.00	$4,000	$4,000	$4,000 per event @ 1 event per year	Based on 2010 site rate of $3,500
Engineer (Report)	80.0	hours	$130.00	$10,400	$10,400	2 events @ 40 hrs/event = 80.0 hours @ 1 units/crew = 80.0 hours	Eng Rate: rate 2011 3rd party quote
Subt - S&A Cert'n & Report				**$14,400**	**$14,400**	*diver(s) to check discharge pipe; also engineer's predischarge qualification report*	Fac Pond 8 out of service empty
(Subt: Assemblies 6.01.2 thru 6.01.3)				**$31,604**	**$31,604**		
6.01.4 Empty (Pump) FAC Pond 1/2						prod'n rate = 960,000 gals/day = 60,000 gals/hr = 1,000 gals/min per facility est @ 16 hrs/day O&M	
FAC Pond 1/2 Inventory in Gallons	*22881000.0*	*gals*	*n/a*			381.4 *total hours req'd to pump*	*Fac Pond 1/2 = 22,881,000 gallons*
AWTS Tech'n (8-hr day shift/straight time)	190.7	day hrs	$65.00	$12,396	$12,396	381.4 tot hrs @ 50% (day shift) = 190.7 hours @ 1 units/crew = 190.7 hours	technician rate: rate 2011 3rd party quote
AWTS Tech'n (8-hr night shift/straight time)	190.7	nite hrs	$65.00	$12,396	$12,396	381.4 tot hrs @ 50% (night shift) = 190.7 hours @ 1 units/crew = 190.7 hours	technician rate: rate 2011 3rd party quote
AWTS Supervisor (day shift only)		day hrs	$85.00	$0	$0	Supervisor included in 6.25 below	
Maintenance (day shift only)	114.4	day hrs	$45.00	$5,148	$5,148	381.4 tot hrs @ 30% (total hrs) = 114.4 hours @ 1 units/crew = 114.4 hours	maintenance rate: rate 2011 3rd party quote
Tech/Sampler (day shift only)	38.1	day hrs	$38.00	$1,448	$1,448	381.4 tot hrs @ 10% (total hrs) = 38.1 hours @ 1 units/crew = 38.1 hours	technician rate: rate 2011 3rd party quote
Engineer (day shift only)		day hrs	$90.00	$0	$0	Engineer included in 6.25 below	
Settleable Solids	95.4	samp	$13.33	$1,272	$1,272	381.4 tot hrs @ 1 samp/4.0 hrs = 95.4 samples	analytical price: average of three quotes
Dissolved Oxygen	1.7	samp	-	$0	$0	381.4 tot hrs @ 1 samp/2 wks = 1.7 samples Field Measurement	analytical price: average of three quotes
Sulfide (total)	1.7	samp	$25.00	$43	$43	381.4 tot hrs @ 1 samp/2 wks = 1.7 samples	analytical price: average of three quotes
Discharge Pump (6"/1,000 gal/min)	381.4	total hrs	$12.34	$4,706	$4,706	381.4 tot hrs @ 100% total time = 381.4 hours @ 1 units/crew = 381.4 hours	RSM/HC p. 475 (line item 01 54 33 70 1300)
Discharge Pipe (6" Diam/3,000 LF)	1144050.0	foot-hrs	$0.0110	$12,585	$12,585	381.4 tot hrs @ 100% total time = 381.4 hours @ 3000 LF/crew = 1144050 foot-hrs	RSM/HC p. 475 (line item 01 54 33 70 0300)
Subtotal - Pump FAC Pond 1/2				**$49,992**	**$49,992**	*transfer contents of FAC Pond 1/2 to discharge pipe to Niagara River* (3,000 ft)	
6.01.5 Treat FAC Pond 3 Contents						FAC Pond 3 contents already have been treated; no further treatment required.	
Treat FAC Pond 3 Contents		gals	$0.00	$0	$0		used unit price of $0.00/gal as no treatment is required
Subt - Treat FAC Pond 3 Contents				**$0**	**$0**	*no treatment required for FAC Pond 3 contents prior to discharge*	
6.01.6 Tranfer (Pump) FAC Pond 8						**Assumes NYSDEC approval of clean closure**	Avg 28.8 inches precipitaiton per year
FAC Pond 8 Inventory in Gallons	0.0	*gals*	*n/a*				*Fac Pond 8 = 0 gallons*
Subtotal - Pump FAC Pond 8				**$0**	**$0**	***FAC Pond 8 closed. Precipitation that enters impoundment managed as stormwater***	
6.7 Empty (Pump) FAC Pond 3						prod'n rate = 960,000 gals/day = 60,000 gals/hr = 1,000 gals/min per facility est @ 16 hrs/day O&M	
FAC Pond 8 Inventory in Gallons	*51355000.0*	*gals*	*n/a*				*FAC Pond 3: 51,355,000 gals*
AWTS Tech'n (8-hr day shift/straight time)	428.0	day hrs	$65.00	$27,820	$27,820	855.9 tot hrs @ 50% (day shift) = 428.0 hours @ 1 units/crew = 428.0 hours	technician rate: rate 2011 3rd party quote
AWTS Tech'n (8-hr night shift/straight time)	428.0	nite hrs	$65.00	$27,820	$27,820	855.9 tot hrs @ 50% (night shift) = 428.0 hours @ 1 units/crew = 428.0 hours	technician rate: rate 2011 3rd party quote
AWTS Supervisor (day shift only)		day hrs	$85.00	$0	$0	Supervisor included in 6.25 below	
Maintenance (day shift only)	256.8	day hrs	$39.00	$10,015	$10,015	855.9 tot hrs @ 30% (total hrs) = 256.8 hours @ 1 units/crew = 256.8 hours	maintenance rate: rate 2011 3rd party quote
Tech/Sampler (day shift only)	85.6	day hrs	$38.00	$3,253	$3,253	855.9 tot hrs @ 10% (total hrs) = 85.6 hours @ 1 units/crew = 85.6 hours	technician rate: rate 2011 3rd party quote
Engineer (day shift only)		day hrs	$90.00	$0	$0	Engineer included in 6.25 below	
Settleable Solids	214.0	samp	$13.33	$2,853	$2,853	855.9 hours @ 1.0 sample per 4.0 hours = 214.0 samples	analytical price: average of three quotes
Dissolved Oxygen	10.7	samp	-	$0	$0	855.9 hours @ 1.0 sample per 80.0 hours = 10.7 samples Field Measurement	analytical price: average of three quotes
Sulfide (total)	10.7	samp	$25.00	$268	$268	855.9 hours @ 1.0 sample per 80.0 hours = 10.7 samples	analytical price: average of three quotes
Discharge Pump (6"/1,000 gal/min)	855.9	hours	$12.34	$10,562	$10,562	855.9 hours @ 100% total time = 855.9 hours @ 1 units/crew = 855.9 hours	RSM/HC p. 475 (line item 01 54 33 70 1300)
Discharge Pipe (6" Diam/0 LF)g p ( )	0.0	foot-hrs	$0.0110	$0	$0	855.9 hours @ 100% total time = 855.9 hours @ 0 LF/crew = 0 hours	RSM/HC p. 475 (line item 01 54 33 70 0300)
Subtotal - Pump FAC Pond 3				**$82,590**	**$82,590**	*transfer contents of FAC Pond 3 to Niagara River*	
(Subt: Assemblies 6.01.4 thru 6.01.7)				**$132,582**	**$132,582**		

6.01 Fac Ponds (3&1-2)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.01.8 Soil/Sed S&A - FAC Pond 1/2							
FAC Pond 1/2 Area in SF	187500.0	*SF*	*n/a*			*18.8 areas = 19 grids: 38 metals 2 hazardous 17 organ*	Fac Pond 1/2 = 187,500 SF; grids @ 100' x 100'
Technician	114.0	hours	$38.00	$4,332	$4,332	57 samps @ 1 hrs/samp = 57.0 hours @ 2 units/crew = 114.0 hours	technician rate: rate 2011 3rd party quote
Sampling Supplies	57.0	samp	$10.00	$570	$570	57 samples	bottles, shipping supplies
USEPA 40CFR Part 264 Append IX	2.0	samp	$1,226.67	$2,453	$2,453	2 samples	analytical price: average of three quotes
Priority Poll'nt Organics (semi-VOC)	17.0	samp	$615.00	$10,455	$10,455	17 samples	analytical price: average of three quotes
Priority Pollutant Metals	38.0	samp	$158.33	$6,017	$6,017	38 samples	analytical price: average of three quotes
Subtotal - Soil/Sed S&A - FAC 1/2				**$23,827**	**$23,827**	*sampling and analyses of FAC Pond 1/2 soils and sediments*	
6.9 Soil/Sed S&A - FAC Pond 3							
FAC Pond 3 Area in SF	495000.0	*SF*	*n/a*			*12.4 areas = 13 grids: 26 metals 2 hazardous 11 organ*	Fac Pond 3 = 495,000 SF; grids @ 200' x 200'
Technician	78.0	hours	$38.00	$2,964	$2,964	39 samps @ 1 hrs/samp = 39.0 hours @ 2 units/crew = 78.0 hours	technician rate: rate 2011 3rd party quote
Sampling Supplies	39.0	samp	$10.00	$390	$390	39 samps @	bottles, shipping supplies
USEPA 40CFR Part 264 Append IX	2.0	samp	$1,226.67	$2,453	$2,453	2 samples	analytical price: average of three quotes
Priority Poll'nt Organics (semi-VOC)	11.0	samp	$615.00	$6,765	$6,765	11 samples	analytical price: average of three quotes
Priority Pollutant Metals	26.0	samp	$158.33	$4,117	$4,117	26 samples	analytical price: average of three quotes
Subtotal - Soil/Sed S&A - FAC 3				**$16,689**	**$16,689**	*sampling and analyses of FAC Pond 3 soils and sediments*	
6.10 Soil/Sed S&A - FAC Pond 8	**Fac Pond 8 Sampling and Analysis performed in 2005. Report submitted November 2009.**					**No COCs above background Assumes NYSDEC approval of clean closure**	
FAC Pond 8 Area in SF	302500.0	*SF*	*n/a*			*7.6 areas =* 8 grids: 16 metals 2 hazardous 6 organ	Fac Pond 8 = 302,500 SF; grids @ 200' x 200'
Subtotal - Soil/Sed S&A - FAC 8				**$0**	**$0**	***sampling and analyses of FAC Pond 8 soils and sediments completed for clean closure***	
(Subt: Assemblies 6.01.8 thru 6.01.10)				**$40,516**	**$40,516**	*sampling and analyses of soils and sediments from FAC Ponds 1/2 and 3*	

6.01.11 Excavate Soil/Sed - FAC 1/2						production rate = 100 CY/hour, includes loading & tranport to stabilization:site experience	
FAC Pond 1/2 Area in SF x 0.5' dp	187500.0	*SF*	*n/a*			*93750 CF = 3472 CY*	
Laborer	34.7	hours	$39.00	$1,353	$1,353	3472.2 CY @ 100 CY/hr = 34.7 hours @ 1 units/crew = 34.7 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	34.7	hours	$45.00	$1,562	$1,562	3472.2 CY @ 100 CY/hr = 34.7 hours @ 1 units/crew = 34.7 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Excavator	34.7	hours	$84.09	$2,918	$2,918	3472.2 CY @ 100 CY/hr = 34.7 hours @ 1 units/crew = 34.7 hours	RSM/HC p. 467 (line item 01 54 33 20 0320)
Driver	34.7	hours	$45.00	$1,562	$1,562	3472.2 CY @ 100 CY/hr = 34.7 hours @ 1 units/crew = 34.7 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (12-ton load)	34.7	hours	$24.78	$860	$860	3472.2 CY @ 100 CY/hr = 34.7 hours @ 1 units/crew = 34.7 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Subt - Excavate Soil/Sed - FAC 1/2				**$8,254**	**$8,254**	*excavate soils and sediments from FAC Pond 1/2*	
6.01.12 Stabilize FAC Pond 1/2						production rate = 100 tons/hour = 800 tons/day; includes loading for transport to landfill	
PROCESS TONS (incl kiln dust)	5390.6	*TONS*	n/a			*3472 CY @ 1.35 ton/CY + 15% kiln dust = 5390.6 tons*	1 CY = 2,700# (1.35 ton) @ 100# per CF
Dump Truck (12-ton load)	53.9	hours	24.78	$1,336	$1,336	5390.6 tons @ 100 tons/hr @ 53.9 hours @ 1 units/crew = 53.9 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Cement Kiln Dust - Mat'l&Delv Cost	703.1	tons	$48.00	$33,749	$33,749	3472 CY @ 1.35 ton/CY @ 15% kiln dust = 703.1 tons	CWM actual 2011 costs
Stabilization Cost	4687.2	tons	$25.00	$117,180	$117,180	*3472 CY @ 1.35 ton/CY =* 4687.2 tons	CWM actual 2011 costs inc. labor & equipment
TCLP (Metals/VOCs/Semi-VOCs)	1.3	each	$446.67	$581	$581	53.9 hours @ 1 test/40 hr = 1.3 tests	analytical price: average of three quotes
Subt - Stabilize FAC Pond 1/2				**$152,845**	**$152,845**	*stabilize soils and sediments from FAC Pond 1/2*	
6.13 Transp FAC 1/2: Offsite Disp						production rate = 0.5 hours/rolloff for on-site travel	
Offsite Transportation - Solids	103757.5	miles	$3.25	$337,212	$0	5390.6 tons @ 20 tons/load = 269.5 loads @ 385 miles/trip = 103757.5 miles	Rate: transporters quote/site experience
Subt - FAC 1/2 to Offsite Landfill				**$337,212**	**$0**	*transport soils & sediments from FAC Pond 1/2 to offsite landfill*	
6.13a Transp/Unload FAC 1/2: Onsite Disp						production rate = 0.5 hours for onsite travel	
Driver	224.6	hours	$45.00	$0	$10,107	5390.6 tons @ 12 tons/load = 449.2 loads @ 0.5 hours/trip = 224.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (12-ton load)	224.6	hours	$24.78	$0	$5,566	5390.6 tons @ 12 tons/load = 449.2 loads @ 0.5 hours/trip = 224.6 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Subt - FAC 1/2 to Onsite Landfill				**$0**	**$15,673**	*onsite disposal of stabilized sediment*	

6.01 Fac Ponds (3&1-2)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.14 Offsite FAC 1/2 Disposal						if onsite landfill capacity not available	
Offsite Disposal - FAC 1/2 Soil/Sed	5390.6	tons	$133.00	$716,950	$0	5390.6 tons	HWC/ETC 2004 & CWM 2011 cost comparison industry pricing based on current market conditions
Subt - Offsite Landfill Disposal				**$716,950**	**$0**	*offsite disposal of soils & sediments from FAC Pond 1/2*	
(Subt: Assemblies 6.01.11 thru 6.01.14)				**$1,215,261**	**$176,772**	*excavation, stabilization, and T&D for FAC Pond 1/2 soils & sediments*	
6.01.15 Excavate Soil/Sed - FAC 3						production rate = 100 CY/hour, includes loading & tranport to stabilization:site experience	
FAC Pond 3 Area in SF x 0.5' dp	495500.0	*SF*	n/a			*247750 CF = 9176 CY*	
Laborer	91.8	hours	$39.00	$3,580	$3,580	9175.9 CY @ 100 CY/hr= 91.8 hours @ 1 units/crew= 91.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	91.8	hours	$45.00	$4,131	$4,131	9175.9 CY @ 100 CY/hr = 91.8 hours @ 1 units/crew = 91.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Excavator	91.8	hours	$84.09	$7,719	$7,719	9175.9 CY @ 100 CY/hr = 91.8 hours @ 1 units/crew = 91.8 hours	RSM/HC p. 467 (line item 01 54 33 20 0320)
Driver	91.8	hours	$45.00	$4,131	$4,131	9175.9 CY @ 100 CY/hr = 91.8 hours @ 1 units/crew = 91.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (12-ton load)	91.8	hours	$24.78	$2,275	$2,275	9175.9 CY @ 100 CY/hr = 91.8 hours @ 1 units/crew = 91.8 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Subt - Excavate Soil/Sed - FAC 3				**$21,836**	**$21,836**	*excavate soils and sediments from FAC Pond 3*	
6.01.16 Stabilize FAC Pond 3						production rate = 100 tons/hour = 800 tons/day; includes loading for transport to landfill	
PROCESS TONS (incl kiln dust)	14245.6	*TONS*	n/a			*9176 CY @ 1.35 ton/CY + 15% kiln dust = 14245.6 tons*	1 CY = 2,700# (1.35 ton) @ 100# per CF
Dump Truck (12-ton load)	142.5	hours	24.78	$3,531	$3,531	14245.6 tons @ 100 tons/hr @ 142.5 hours @ 1 units/crew = 142.5 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Cement Kiln Dust - Mat'l&Delv Cost	1858.1	tons	$48.00	$89,189	$89,189	9176 CY @ 1.35 ton/CY @ 15% kiln dust = 1858.1 tons	CWM actual 2011 costs
Stabilization Cost	12387.6	tons	$25.00	$309,690	$309,690	9176 CY @ 1.35 ton/CY = 12387.6	CWM actual 2011 costs inc. labor & equipment
TCLP (Metals/VOCs/Semi-VOCs)	11.9	each	$446.67	$5,315	$5,315	474.9 hours @ 1 test/40 hr = 11.9 tests	analytical price: average of three quotes
Subt - Stabilize FAC Pond 3				**$407,725**	**$407,725**	*stabilize soils and sediments from FAC Pond 3*	
6.01.17 Transp FAC 3: Offsite Disp						production rate = 0.5 hours/rolloff for on-site travel	
Offsite Transportation - Solids	274235.5	miles	$3.25	$891,265	$0	14245.6 tons @ 20 tons/load = 712.3 loads @ 1385 hours/trip = 274,235.5 miles	Rate: transporters quote/site experience
Subt - FAC 3 to Offsite Landfill				**$891,265**	**$0**	*transport soils & sediments from FAC Pond 3 to offsite landfill*	
6.01.17a Transp/Unload FAC 3: Onsite Disp						production rate = 0.5 hours for onsite travel	
Driver	593.6	hours	$45.00	$0	$26,712	14245.6 tons @ 12 tons/load = 1187.1 loads @ 0.5 hours/trip = 593.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (12-ton load)	593.6	hours	$24.78	$0	$14,709	14245.6 tons @ 12 tons/load = 1187.1 loads @ 0.5 hours/trip = 593.6 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Subt - FAC 3 to Onsite Landfill				**$0**	**$41,421**	*onsite disposal of stabilized sediment*	
6.01.18 Offsite FAC 3 Disposal						in-house estimate = $0 for on-site disposal	
Disposal - FAC 3 Soil/Sediments	14245.6	tons	$133.00	$1,894,665	$0	14245.6 tons	HWC/ETC 2004 & CWM 2011 cost comparison industry pricing based on current market conditions
Subt - Offsite Landfill Disposal				**$1,894,665**	**$0**	*offsite disposal of soils & sediments from FAC Pond 3*	
(Subt: Assemblies 6.01.15 thru 6.01.18)				**$3,215,492**	**$470,983**	*excavation, stabilization, and T&D for FAC Pond 3 soils & sediments*	
6.01.19 Backfill/Grade - FAC 1/2						production rate = 200 CY/hour, site experience w/ 2 dozers; 11,000 CY onsite soil/clay available from berms	
FAC Pond 1/2 Backfill Volume	31250.0	*CY*	n/a			*31250 CY minus 11000 CY onsite = 20250 CY borrow*	
Laborer	156.3	hours	$39.00	$6,094	$6,094	31250 CY @ 200 CY/hr= 156.25 hours @ 1 units/crew= 156.25 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	312.5	hours	$45.00	$14,063	$14,063	31250 CY @ 200 CY/hr= 156.25 hours @ 2 units/crew = 312.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dozer (200 hp)	312.5	hours	$56.38	$17,619	$17,619	31250 CY @ 200 CY/hr= 156.25 hours @ 2 units/crew = 312.5 hours	RSM/HC p. 468 (line item 01 54 33 20 4260)
Offsite Borrow - Material & Delivery Cost	20250.0	CY	$11.00	$222,750	$222,750	20250 CY	3rd party quote for RMU-1 final cover construction Assb. 14.0
Subt - Backfill/Grade - FAC 1/2				**$260,525**	**$260,525**	*backfill and grade FAC Pond 1/2*	

6.01 Fac Ponds (3&1-2)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.01.20 Backfill/Grade - FAC 3						production rate = 200 CY/hour, site experience w/ 2 dozers	
FAC Pond 3 Backfill Volume	137500.0	*CY*	n/a			*137500 CY minus 0 CY onsite = 137500 CY borrow*	
Laborer	687.5	hours	$39.00	$26,813	$26,813	137500 CY @ 200 CY/hr = 687.5 hours @ 1 units/crew = 687.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	1375.0	hours	$45.00	$61,875	$61,875	137500 CY @ 200 CY/hr = 687.5 hours @ 2 units/crew = 1375.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dozer (200 hp)	1375.0	hours	$56.38	$77,523	$77,523	137500 CY @ 200 CY/hr = 687.5 hours @ 2 units/crew = 1375.0 hours	RSM/HC p. 468 (line item 01 54 33 20 4260)
Offsite Borrow - Material & Delivery Cost	137500.0	CY	$11.00	$1,512,500	$1,512,500	137500 CY	3rd party quote for RMU-1 final cover construction Assb. 14.0
Subt - Backfill/Grade - FAC 3				**$1,678,710**	**$1,678,710**	*backfill and grade FAC Pond 3*	
6.01.21 Backfill/Grade - FAC 8							**Assumes Sitewide Permit Modified for construction of RMU-2**
FAC Pond 8 Backfill Volume	0.0	*CY*	n/a				
Subt - Backfill/Grade - FAC 8				**$0**	**$0**	***backfill and grade FAC Pond 8 not necessary. Area used for Cell 20 of RMU-2***	
(Subt: Assemblies 6.01.19 thru 6.01.21)				**$1,939,235**	**$1,939,235**	*backfill and grade FAC Ponds 1/2 and 3*	

6.01.22 Seed/Fertilize FAC 1/2 & 3						soil prep prod' rate = 33K sf/day (0.75 ac/day); seed/fert prod'n rate = 80K sf/day (1.8 ac/day)	
FAC Pond 1/2 Surface Area	309.3	*MSF*	*n/a*			*7.1 acres*	
FAC Pond 3 Surface Area	575.0	*MSF*	*n/a*			*13.2 acres*	
FAC Pond 8 Surface Area	0.0	*MSF*	*n/a*			*0 acres* **Area used for Cell 20 of RMU-2**	**Seed/fertilize of FAC Pond 8 not necessary.**
Soil Preparation	0.0	MSF	$0.00	$0	$0	Not necessary	
Seeding & Fertilizing	884.3	MSF	$73.97	$65,412	$65,412	884.3 MSF	2004 DEC Rate * Implicit Deflator
Subt - Seed/Fert FACs 1/2, 3, & 8				**$65,412**	**$65,412**	*seeding and fertilizing FAC Ponds 1/2 and 3*	
(Subt: Assemblies 6.01.22 thru 6.01.22)				**$65,412**	**$65,412**	*seeding and fertilizing FAC Ponds 1/2 and 3*	

6.01.23 GW Well Monitoring						production = 0.5 hours/sample for two techs	
Technician	20.0	hours	$38.00	$760	$760	20.0 samp @ 0.5 hrs/samp = 10.0 hours @ 2 units/crew = 20.0 hours	technician rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	20.0	samp	$25.00	$500	$500	20.0 samples	bottles, shipping supplies
VOC Analysis (EPA 624)	20.0	samp	$105.00	$2,100	$2,100	20.0 points @ 1.0 samps/pt = 20.0 samples	analytical price: average of three quotes
Subt - GW Well Monitoring				**$3,360**	**$3,360**	*monitoring of seven monitoring wells (plus three QA blanks/duplicates) - two events during one year closure*	Monitoring of Fac Ponds 1&2 and 3
(Subt: Assemblies 6.01.23 thru 6.01.23)				**$3,360**	**$3,360**		

Total Non-Super hours 5711.3

6.01.24 PPE Usage & H&S Planning						Level C @ 0%; Level Mod C @ 25%; Level D @ 75% for tot non-supv hrs for all tasks; HASP @ 2.5% of non-supv hrs	
PPE Usage - Level D	535.4	days	$0.00	$0	$0	5711.3 hours @ 8 hr/day = 713.9 days @ 75% "D" days = 535.4 days	Standard Work Clothes - Site Experience
PPE Usage - Mod Level C	178.5	days	$9.00	$1,607	$1,607	5711.3 hours @ 8 hr/day = 713.9 days @ 25% "C" days = 178.5 days	25% of non-supv hrs in Mod Level C (price: $9/day)
PPE Usage - Level C	0.0	days	$25.00	$0	$0	5711.3 hours @ 8 hr/day = 713.9 days @ 0% "C" days = 0.0 days	0% of non-supv hrs in Level C (price: $25/day)
Health & Safety Officer	142.8	hours	$75.00	$10,710	$10,710	5711.3 hours @ 2.5% hr/hr = 142.8 hours	Safety Eng Rate: rate 2011 3rd party quote
Subt - PPE Usage/H&S Planning				**$12,317**	**$12,317**		
6.01.25 Supervision						18 weeks for closure of FAC Ponds	
Foreman	720.0	hours	$65.00	$46,800	$46,800	18 weeks @ 40 hrs/wk = 720.0 hours	Foreman rate 2011 3rd party quote
Site Project Manager	0.0	hours	$75.00	$0	$0	Included in Gen'l Contractor G&A/Home Office indirect costs	loaded labor rate: loaded labor rate 2011 3rd party quote
Subtotal - Supervision				**$46,800**	**$46,800**		
6.01.26 Certification						Engineer @ 1.5% and Clerical @ 1.5% of total non-supervisory labor hours for all tasks	
Engineer	85.7	hours	$130.00	$11,141	$11,141	5711.3 hours @ 0.015 hr/hr = 85.7 hours	Engineer rate: 2011 3rd party quote
Clerical	85.7	hours	$45.00	$3,857	$3,857	5711.3 hours @ 0.015 hr/hr = 85.7 hours	Clerical rate: 2011 3rd party quote
Subtotal - Certification				**$14,998**	**$14,998**		
(Subt: Assemblies 6.24 thru 6.26)				**$74,114**	**$74,114**	*supervision, health & safety, and certification*	

6.01 Fac Ponds	**Direct Cost**	**Total**	**Basic**	**$6,717,653**	**$2,934,655**

6.01 Fac Ponds (3 & 1-2)

Total Cost Summary

Cost Category	Proposed Percent of Direct Cost	Proposed 2011 Cost OffSite Disposal	Cost Range
Direct Costs/Basic Disposal		$6,717,653	
Plus Indirect Costs/Profit:			
Site Activity Management Costs	7.00%	$470,236	note: DEC uses 7%
Gen'l Contractor G&A/Home Office	4.00%	$268,706	note: DEC uses 4%
Pre-Construction Design Costs	6.00%	$403,059	note: DEC uses 6%
Engineering During Construction	2.00%	$134,353	note: DEC uses 2%
General Contractor Profit	6.00%	$403,059	Note DEC adds 6%
Indirect Costs/Basic Disposal	25.00%	$1,679,413	
Subt: Fac Ponds		$8,397,067	
Plus Contingency	10.00%	$839,707	CWM and DEC 10%
Tot: Fac Ponds		$9,236,773	

Cost References:
"RSM/HC" refers to the RSMeans "Heavy Construction Cost Data", 2009 Edition (rates adjusted for inflation)
"RSM/UP" refers to the RSMeans "Environmental Remediation Cost Data - Unit Price", 2004 Edition (rates adjusted for inflation)
"RSM/BC" refers to the RSMeans "Building Construction Cost Data", 2003 Edition (rates adjusted for inflation)

6.02 Fac Ponds (Fac 1&2, 3, and New 5)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.02.1 Inventory Verification						production rate: 0.5 hour/pond to take depth estimate and estimate volume; two persons required	
Laborer	3.0	hours	$39.00	$117	$117	3 ponds @ 0.5 hr/pond = 1.5 hours @ 2 units/crew = 3.0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
Subtotal - Inventory Verification				**$117**	**$117**		
(Subt: Assemblies 6.02.1)				**$117**	**$117**	*inventory of liquid volumes in Ponds 1/2, 3, & 5*	

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.02.2 Ponds' Sampling & Analysis						production rate = 2.0 hours per composite sample for a three-person crew	
Batch Sampling Events						3 *events @* 3 *samp/evnt=* 9 *samples*	sampling & analysis prior to pond discharge
Technician	54.0	hours	$38.00	$2,052	$2,052	9 samps @ 2.0 hrs/samp = 18.0 hours @ 3 units/crew = 54.0 hours	technician rate: rate 2011 3rd party quote
Sampling Equipment	18.0	hours	$25.00	$450	$450	9 samps @ 2.0 hrs/samp = 18.0 hours @ 1 units/crew = 18.0 hours	boat, samplers, meters, etc.
Sampling Supplies	9.0	samp	$25.00	$225	$225	9 samples	bottles, shipping supplies
pH	9.0	samp	$10.67	$96	$96	9 samples	analytical price: average of three quotes
Specific Conductance	9.0	samp	$13.33	$120	$120	9 samples	analytical price: average of three quotes
Temperature	9.0	samp	-	$0	$0	9 samples obtained using field equipment	Obtained using field equipment
Dissolved Oxygen	9.0	samp	-	$0	$0	9 samples obtained using field equipment	Obtained using field equipment
Total Dissolved solids (TDS)	9.0	samp	$15.00	$135	$135	9 samples	analytical price: average of three quotes
TDVS (total dissolved volatile solids)	9.0	samp	$23.33	$210	$210	9 samples	analytical price: average of three quotes
Alkalinity as CaCO3	9.0	samp	$15.33	$138	$138	9 samples	analytical price: average of three quotes
TOC	9.0	samp	$31.67	$285	$285	9 samples	analytical price: average of three quotes
Ca/Mg Hardness (200.7)	9.0	samp	$24.33	$219	$219	9 samples	analytical price: average of three quotes
Total Suspended Solids (TSS)	9.0	samp	$13.33	$120	$120	9 samples	analytical price: average of three quotes
Settleable Solids	9.0	samp	$13.33	$120	$120	9 samples	analytical price: average of three quotes
Ammonia (NH3)	9.0	samp	$22.67	$204	$204	9 samples	analytical price: average of three quotes
Phosphorous	9.0	samp	$20.00	$180	$180	9 samples	analytical price: average of three quotes
TON (TKN-NH3)	9.0	samp	$41.67	$375	$375	9 samples	analytical price: average of three quotes
Cyanide	9.0	samp	$35.00	$315	$315	9 samples	analytical price: average of three quotes
Sulfates	9.0	samp	$21.00	$189	$189	9 samples	analytical price: average of three quotes
Sulfides	9.0	samp	$25.00	$225	$225	9 samples	analytical price: average of three quotes
Surfactants (MBAS)	9.0	samp	$28.33	$255	$255	9 samples	analytical price: average of three quotes
BOD-5	9.0	samp	$30.00	$270	$270	9 samples	analytical price: average of three quotes
Fluoride	9.0	samp	$19.33	$174	$174	9 samples	analytical price: average of three quotes
Chlorine	9.0	samp	$19.33	$174	$174	9 samples	analytical price: average of three quotes
Residual Chlorine	9.0	samp	$15.00	$135	$135	9 samples	analytical price: average of three quotes
NO2	9.0	samp	$21.00	$189	$189	9 samples	analytical price: average of three quotes
NO3	9.0	samp	$19.33	$174	$174	9 samples	analytical price: average of three quotes
VOCs (624)	9.0	samp	$105.00	$945	$945	9 samples	analytical price: average of three quotes
Semi-volatile organics (625)	9.0	samp	$208.33	$1,875	$1,875	9 samples	analytical price: average of three quotes
Pesticides/PCBs (608) (MDL 65 PPT (ng/l))	9.0	samp	$133.33	$1,200	$1,200	9 samples	analytical price: average of three quotes
Oil & Grease (1631)	9.0	samp	$21.67	$195	$195	9 samples	analytical price: average of three quotes
total Phenols	9.0	samp	$26.67	$240	$240	9 samples	analytical price: average of three quotes
Priority Pollutant Metals (200.7) *	9.0	samp	$188.00	$1,692	$1,692	9 samples	analytical price: average of three quotes
Mercury (245.1)	9.0	samp	$25.00	$225	$225	9 samples	analytical price: average of three quotes
Mercury (1631B)	9.0	samp	$111.67	$1,005	$1,005	9 samples	analytical price: average of three quotes
Acute Toxicity/Bioassy	3.0	samp	$3,800.00	$11,400	$11,400	3 samples	One quote: actual cost for 2010
Subt - Ponds' Sampling & Analysis				**$25,806**	**$25,806**	*three pond discharges (batches) requiring sampling & analysis*	Fac Pond 8 out of service empty

6.02 Fac Ponds (Fac 1&2, 3, and New 5)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.02.3 S&A Certification & Report						one event per year for divers to check discharge pipe; two 40-hour predischarge qualification reports	
Divers (Sr. Technicians)	0.0	hours	$0.00	$0	$0	Included in underwater inspection below	
SCBA Gear (2 units)	0.0	hours	$0.00	$0	$0	Included in underwater inspection below	
Laborer (Surface Support)	0.0	hours	$0.00	$0	$0	Included in underwater inspection below	
Underwater Inspection	1.0	each	$4,000.00	$4,000	$4,000	$4,000 per event @ 1 event per year	Based on 2010 site rate of $3,500
Engineer (Report)	120.0	hours	$130.00	$15,600	$15,600	3 events @ 40 hrs/event = 120.0 hours @ 1 units/crew = 120.0 hours	Eng Rate: rate 2011 3rd party quote
Subt - S&A Cert'n & Report				**$19,600**	**$19,600**	*diver(s) to check discharge pipe; also engineer's predischarge qualification report*	Fac Pond 8 out of service empty
(Subt: Assemblies 6.02.2 thru 6.02.3)				**$45,406**	**$45,406**		
6.02.4 Empty (Pump) FAC Pond 1/2						prod'n rate = 960,000 gals/day = 60,000 gals/hr = 1,000 gals/min per facility est @ 16 hrs/day O&M	
FAC Pond 1/2 Inventory in Gallons	*22881000.0*	*gals*	*n/a*			381.4 *total hours req'd to pump*	*Fac Pond 1/2 = 22,881,000 gallons*
AWTS Tech'n (8-hr day shift/straight time)	190.7	day hrs	$65.00	$12,396	$12,396	381.4 tot hrs @ 50% (day shift) = 190.7 hours @ 1 units/crew = 190.7 hours	technician rate: rate 2011 3rd party quote
AWTS Tech'n (8-hr night shift/straight time)	190.7	nite hrs	$65.00	$12,396	$12,396	381.4 tot hrs @ 50% (night shift) = 190.7 hours @ 1 units/crew = 190.7 hours	technician rate: rate 2011 3rd party quote
AWTS Supervisor (day shift only)		day hrs	$85.00	$0	$0	Supervisor included in 6.25 below	
Maintenance (day shift only)	114.4	day hrs	$45.00	$5,148	$5,148	381.4 tot hrs @ 30% (total hrs) = 114.4 hours @ 1 units/crew = 114.4 hours	maintenance rate: rate 2011 3rd party quote
Tech/Sampler (day shift only)	38.1	day hrs	$38.00	$1,448	$1,448	381.4 tot hrs @ 10% (total hrs) = 38.1 hours @ 1 units/crew = 38.1 hours	technician rate: rate 2011 3rd party quote
Engineer (day shift only)		day hrs	$90.00	$0	$0	Engineer included in 6.25 below	
Settleable Solids	95.4	samp	$13.33	$1,272	$1,272	381.4 tot hrs @ 1 samp/4.0 hrs = 95.4 samples	analytical price: average of three quotes
Dissolved Oxygen	1.7	samp	-	$0	$0	381.4 tot hrs @ 1 samp/2 wks = 1.7 samples Field Measurement	analytical price: average of three quotes
Sulfide (total)	1.7	samp	$25.00	$43	$43	381.4 tot hrs @ 1 samp/2 wks = 1.7 samples	analytical price: average of three quotes
Discharge Pump (6"/1,000 gal/min)	381.4	total hrs	$12.34	$4,706	$4,706	381.4 tot hrs @ 100% total time = 381.4 hours @ 1 units/crew = 381.4 hours	RSM/HC p. 475 (line item 01 54 33 70 1300)
Discharge Pipe (6" Diam/3,000 LF)	1144050.0	foot-hrs	$0.0110	$12,585	$12,585	381.4 tot hrs @ 100% total time = 381.4 hours @ 3000 LF/crew = 1144050 foot-hrs	RSM/HC p. 475 (line item 01 54 33 70 0300)
Subtotal - Pump FAC Pond 1/2				**$49,992**	**$49,992**	*transfer contents of FAC Pond 1/2 to discharge pipe to Niagara River* (3,000 ft)	
6.02.5 Transfer (Pump) FAC Pond 5						prod'n rate = 960,000 gals/day = 60,000 gals/hr = 1,000 gals/min per facility est @ 16 hrs/day O&M	
FAC Pond 5 Inventory in Gallons	24700000.0	*gals*	*n/a*			*412 total hours req'd to pump* 24700000gal/60000gal/hr = 412hr	*Fac Pond 5= 24,700,000 gallons*
AWTS Tech'n (8-hr day shift/straight time)	206.0	day hrs	$65.00	$13,390	$13,390	412 tot hrs @ 50% (day shift) = 206 hours @ 1 units/crew = 206 hours	technician rate: rate 2011 3rd party quote
AWTS Tech'n (8-hr night shift/straight time)	206.0	nite hrs	$65.00	$13,390	$13,390	412 tot hrs @ 50% (night shift) = 206 hours @ 1 units/crew = 206 hours	technician rate: rate 2011 3rd party quote
AWTS Supervisor (day shift only)		day hrs	$85.00	$0	$0	Supervisor included in 6.01.28 below	
Maintenance (day shift only)	123.6	day hrs	$45.00	$5,562	$5,562	412 tot hrs @ 30% (total hrs) = 123.6 hours @ 1 units/crew = 123.6 hours	maintenance rate: rate 2011 3rd party quote
Tech/Sampler (day shift only)	41.2	day hrs	$38.00	$1,566	$1,566	412 tot hrs @ 10% (total hrs) = 41.2 hours @ 1 units/crew = 41.2 hours	technician rate: rate 2011 3rd party quote
Engineer (day shift only)		day hrs	$90.00	$0	$0	Engineer included in 6.01.28 below	
Settleable Solids	103.0	samp	$13.33	$1,373	$1,373	412 hours @ 1.0 sample per 4.0 hours = 103 samples	analytical price: average of three quotes
Dissolved Oxygen	5.2	samp	-	$0	$0	412 hours @ 1.0 sample per 80.0 hours = 5.2 samples Field Measurement	analytical price: average of three quotes
Sulfide (total)	5.2	samp	$25.00	$130	$130	412 hours @ 1.0 sample per 80.0 hours = 5.2 samples	analytical price: average of three quotes
Discharge Pump (6"/1,000 gal/min)	412.0	total hrs	$12.34	$5,084	$5,084	412 tot hrs @ 100% total time = 412 hours @ 1 units/crew = 412 hours	RSM/HC p. 475 (line item 01 54 33 70 1300)
Discharge Pipe (6" Diam/3,000 LF)	1236000.0	foot-hrs	$0.0110	$13,596	$13,596	412 tot hrs @ 100% total time = 412 hours @ 3000 LF/crew = 1236000 foot-hrs	RSM/HC p. 475 (line item 01 54 33 70 0300)
Subtotal - Pump FAC Pond 5				**$54,091**	**$54,091**	*transfer contents of FAC Pond 5 to discharge pipe to Niagara River* (3,000 ft)	

6.02 Fac Ponds (Fac 1&2, 3, and New 5)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.02.6 Empty (Pump) FAC Pond 3						prod'n rate = 960,000 gals/day = 60,000 gals/hr = 1,000 gals/min per facility est @ 16 hrs/day O&M	
FAC Pond 8 Inventory in Gallons	*51355000.0*	*gals*	*n/a*				*FAC Pond 3: 51,355,000 gals*
AWTS Tech'n (8-hr day shift/straight time)	428.0	day hrs	$65.00	$27,820	$27,820	855.9 tot hrs @ 50% (day shift) = 428.0 hours @ 1 units/crew = 428.0 hours	technician rate: rate 2011 3rd party quote
AWTS Tech'n (8-hr night shift/straight time)	428.0	nite hrs	$65.00	$27,820	$27,820	855.9 tot hrs @ 50% (night shift) = 428.0 hours @ 1 units/crew = 428.0 hours	technician rate: rate 2011 3rd party quote
AWTS Supervisor (day shift only)		day hrs	$85.00	$0	$0	Supervisor included in 6.25 below	
Maintenance (day shift only)	256.8	day hrs	$39.00	$10,015	$10,015	855.9 tot hrs @ 30% (total hrs) = 256.8 hours @ 1 units/crew = 256.8 hours	maintenance rate: rate 2011 3rd party quote
Tech/Sampler (day shift only)	85.6	day hrs	$38.00	$3,253	$3,253	855.9 tot hrs @ 10% (total hrs) = 85.6 hours @ 1 units/crew = 85.6 hours	technician rate: rate 2011 3rd party quote
Engineer (day shift only)		day hrs	$90.00	$0	$0	Engineer included in 6.25 below	
Settleable Solids	214.0	samp	$13.33	$2,853	$2,853	855.9 hours @ 1.0 sample per 4.0 hours = 214.0 samples	analytical price: average of three quotes
Dissolved Oxygen	10.7	samp	-	$0	$0	855.9 hours @ 1.0 sample per 80.0 hours = 10.7 samples Field Measurement	analytical price: average of three quotes
Sulfide (total)	10.7	samp	$25.00	$268	$268	855.9 hours @ 1.0 sample per 80.0 hours = 10.7 samples	analytical price: average of three quotes
Discharge Pump (6"/1,000 gal/min)	855.9	hours	$12.34	$10,562	$10,562	855.9 hours @ 100% total time = 855.9 hours @ 1 units/crew = 855.9 hours	RSM/HC p. 475 (line item 01 54 33 70 1300)
Discharge Pipe (6" Diam/0 LF)g p ( )	0.0	foot-hrs	$0.0110	$0	$0	855.9 hours @ 100% total time = 855.9 hours @ 0 LF/crew = 0 hours	RSM/HC p. 475 (line item 01 54 33 70 0300)
Subtotal - Pump FAC Pond 3				**$82,590**	**$82,590**	*transfer contents of FAC Pond 3 to Niagara River*	
(Subt: Assemblies 6.02.4 thru 6.02.6)				**$186,673**	**$186,673**		
6.02.7 Remove Fac Pond 5 Liner System						**Ballast area assume 1.73 acres**	
FAC Pond 5 Ballast Area in SF x 1' dp	2795.0	*CY*	*n/a*			75,471 SF * 1ft. Depth / 27 = *2795 CY*	
Laborer	28.0	hours	$39.00	$1,092	$1,092	2,795 CY @ 100 CY/hr = 28.0 hours @ 1 units/crew = 28.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	28.0	hours	$45.00	$1,260	$1,260	2,795 CY @ 100 CY/hr = 28.0 hours @ 1 units/crew = 28.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Excavator	28.0	hours	$84.09	$2,355	$2,355	2,795 CY @ 100 CY/hr = 28.0 hours @ 1 units/crew = 28.0 hours	RSM/HC p. 467 (line item 01 54 33 20 0320)
Driver	28.0	hours	$45.00	$0	$1,260	2,795 CY @ 100 CY/hr = 28.0 hours @ 1 units/crew = 28.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (12-ton load) Onsite Disposal	28.0	hours	$24.78	$0	$694	2,795 CY @ 100 CY/hr = 28.0 hours @ 1 units/crew = 28.0 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Offsite Transportation - Ballast	1034.0	miles	$3.25	$3,361	$0	4136.6 tons @ 20 tons/load = 206.8 loads @ 5 miles/trip = 1034 miles	Rate: transporters quote/site experience
Offsite Disposal - FAC 5 Ballast	4136.6	tons	$27.00	$111,688	$0	Assume non-hazardous material 2795 CY * 1.48 ton/CY = 4136.6 tons	1.48 ton/CY industry standard for gravel.
Subtotal - Ballast Removal				**$119,755**	**$6,660**		Non-Haz Disposal/Site Experience
						Geosynthetic Footprint Area = 235,455 SF = 5.4 acres	
Fac Pond 5 Geo-synthetic Removal	781836.0	SF	*n/a*			5.4 acres * 43,560 SF/Acre = 235,455 SF	
EIA Geomembrane Disposal	470910.0	SF	*n/a*			2 layers @ 5.4 acres 470,910 SF @ 0.22lb/SF = 51.8 tons	1 roll = 16,100SF = 3,500lbs = 0.22lb/SF
Geocomposite Disposal	235455.0	SF	*n/a*			1 layer @ 5.4 acres 235,455 SF @ 0.41lb/SF = 48.3 tons	1 roll = 2,200 SF = 900 lbs = 0.41lb/SF
Non-woven Geotextile Disposal	75471.0	SF	*n/a*			1.73 acres (Beneath Ballast) 75,471 SF @ 0.13lb/SF = 4.9 tons	1 roll = 4,500 SF = 600lbs = 0.13lb/SF
Laborer	156.4	hours	$39.00	$6,100	$6,100	781,836 SF @ 5,000 SF/hr = 156.4 hours @ 1 units/crew = 156.4 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	156.4	hours	$45.00	$7,038	$7,038	781,836 SF @ 5,000 SF/hr = 156.4 hours @ 1 units/crew = 156.4 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Excavator	156.4	hours	$84.09	$13,152	$13,152	781,836 SF @ 5,000 SF/hr = 156.4 hours @ 1 units/crew = 156.4 hours	RSM/HC p. 467 (line item 01 54 33 20 0320)
Driver	156.4	hours	$45.00	$0	$7,038	781,836 SF @ 5,000 SF/hr = 156.4 hours @ 1 units/crew = 156.4 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (12-ton load)	156.4	hours	$24.78	$0	$3,876	781,836 SF @ 5,000 SF/hr = 156.4 hours @ 1 units/crew = 156.4 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Offsite Transportation - Geosynthetics	43.8	miles	$3.25	$142	$0	105 tons @ 12 tons/load = 8.75 loads @ 5 miles/trip = 43.75 miles	Rate: transporters quote/site experience
Offsite Disposal - FAC 5 Geosynthetics	105.0	tons	$27.00	$2,835	$0	781,836 SF = 105 tons	Non-Haz Disposal/Site Experience
Subtotal - Geosynthetic Removal				**$29,266**	**$37,203**		
(Subt: Assemblies 6.02.7)				**$149,022**	**$43,863**		
6.02.8 Soil/Sed S&A - FAC Pond 1/2							
FAC Pond 1/2 Area in SF	187500.0	*SF*	*n/a*			*18.8* areas = *19 grids: 38 metals 2 hazardous 17 organ*	Fac Pond 1/2 = 187,500 SF; grids @ 100' x 100'
Technician	114.0	hours	$38.00	$4,332	$4,332	57 samps @ 1 hrs/samp = 57.0 hours @ 2 units/crew = 114.0 hours	technician rate: rate 2011 3rd party quote
Sampling Supplies	57.0	samp	$10.00	$570	$570	57 samples	bottles, shipping supplies
USEPA 40CFR Part 264 Append IX	2.0	samp	$1,226.67	$2,453	$2,453	2 samples	analytical price: average of three quotes
Priority Poll'nt Organics (semi-VOC)	17.0	samp	$615.00	$10,455	$10,455	17 samples	analytical price: average of three quotes
Priority Pollutant Metals	38.0	samp	$158.33	$6,017	$6,017	38 samples	analytical price: average of three quotes
Subtotal - Soil/Sed S&A - FAC 1/2				**$23,827**	**$23,827**	*sampling and analyses of FAC Pond 1/2 soils and sediments*	

6.02 Fac Ponds (Fac 1&2, 3, and New 5)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.02.9 Soil/Sed S&A - FAC Pond 3							
FAC Pond 3 Area in SF	495000.0	*SF*	*n/a*			*12.4 areas = 13 grids: 26 metals 2 hazardous* 11 organ	Fac Pond 3 = 495,000 SF; grids @ 200' x 200'
Technician	78.0	hours	$38.00	$2,964	$2,964	39 samps @ 1 hrs/samp = 39.0 hours @ 2 units/crew = 78.0 hours	technician rate: rate 2011 3rd party quote
Sampling Supplies	39.0	samp	$10.00	$390	$390	39 samps @	bottles, shipping supplies
USEPA 40CFR Part 264 Append IX	2.0	samp	$1,226.67	$2,453	$2,453	2 samples	analytical price: average of three quotes
Priority Poll'nt Organics (semi-VOC)	11.0	samp	$615.00	$6,765	$6,765	11 samples	analytical price: average of three quotes
Priority Pollutant Metals	26.0	samp	$158.33	$4,117	$4,117	26 samples	analytical price: average of three quotes
Subtotal - Soil/Sed S&A - FAC 3				**$16,689**	**$16,689**	*sampling and analyses of FAC Pond 3 soils and sediments*	
6.02.10 Soil/Sed S&A - FAC Pond 5							
FAC Pond 5 Area in SF	235455.0	*SF*	*n/a*			5.9 *areas =* 6 grids: 12 metals 2 hazardous 4 organ	Fac Pond 5 = 235,455 SF; grids @ 200' x 200'
Technician	36.0	hours	$38.00	$1,368	$1,368	18 samps @ 1 hrs/samp = 18 hours @ 2 units/crew = 36 hours	technician rate: rate 2011 3rd party quote
Sampling Supplies	18.0	samp	$10.00	$180	$180	18 samps @ Sample counts per Fac Pond Closure Plan	bottles, shipping supplies
USEPA 40CFR Part 264 Append IX	2.0	samp	$1,226.67	$2,453	$2,453	2 samples	analytical price: average of three quotes
Priority Poll'nt Organics (semi-VOC)	4.0	samp	$615.00	$2,460	$2,460	7 samples	analytical price: average of three quotes
Priority Pollutant Metals	12.0	samp	$158.33	$1,900	$1,900	18 samples	analytical price: average of three quotes
Subtotal - Soil/Sed S&A - FAC 5				**$8,361**	**$8,361**	*sampling and analyses of FAC Pond 5 clay liner*	
(Subt: Assemblies 6.02.8 thru 6.02.10)				**$48,877**	**$48,877**	*sampling and analyses of soils and sediments from FAC Ponds 1/2, 3, and 5*	
6.02.11 Excavate Soil/Sed - FAC 1/2						production rate = 100 CY/hour, includes loading & transport to stabilization:site experience	
FAC Pond 1/2 Area in SF x 0.5' dp	187500.0	*SF*	*n/a*			*93750 CF = 3472 CY*	
Laborer	34.7	hours	$39.00	$1,353	$1,353	3472.2 CY @ 100 CY/hr = 34.7 hours @ 1 units/crew = 34.7 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	34.7	hours	$45.00	$1,562	$1,562	3472.2 CY @ 100 CY/hr = 34.7 hours @ 1 units/crew = 34.7 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Excavator	34.7	hours	$84.09	$2,918	$2,918	3472.2 CY @ 100 CY/hr = 34.7 hours @ 1 units/crew = 34.7 hours	RSM/HC p. 467 (line item 01 54 33 20 0320)
Driver	34.7	hours	$45.00	$1,562	$1,562	3472.2 CY @ 100 CY/hr = 34.7 hours @ 1 units/crew = 34.7 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (12-ton load)	34.7	hours	$24.78	$860	$860	3472.2 CY @ 100 CY/hr = 34.7 hours @ 1 units/crew = 34.7 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Subt - Excavate Soil/Sed - FAC 1/2				**$8,254**	**$8,254**	*excavate soils and sediments from FAC Pond 1/2*	
6.02.12 Stabilize FAC Pond 1/2						production rate = 100 tons/hour = 800 tons/day; includes loading for transport to landfill	
PROCESS TONS (incl kiln dust)	5390.6	*TONS*	n/a			*3472 CY @ 1.35 ton/CY + 15% kiln dust = 5390.6 tons*	1 CY = 2,700# (1.35 ton) @ 100# per CF
Dump Truck (12-ton load)	53.9	hours	24.78	$1,336	$1,336	5390.6 tons @ 100 tons/hr @ 53.9 hours @ 1 units/crew = 53.9 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Cement Kiln Dust - Mat'l&Delv Cost	703.1	tons	$48.00	$33,749	$33,749	3472 CY @ 1.35 ton/CY @ 15% kiln dust = 703.1 tons	CWM actual 2011 costs
Stabilization Cost	4687.2	tons	$25.00	$117,180	$117,180	*3472 CY @ 1.35 ton/CY =* 4687.2 tons	CWM actual 2011 costs inc. labor & equipment
TCLP (Metals/VOCs/Semi-VOCs)	1.3	each	$446.67	$581	$581	53.9 hours @ 1 test/40 hr = 1.3 tests	analytical price: average of three quotes
Subt - Stabilize FAC Pond 1/2				**$152,845**	**$152,845**	*stabilize soils and sediments from FAC Pond 1/2*	
6.02.13 Transp FAC 1/2: Offsite Disp						production rate = 0.5 hours/rolloff for on-site travel	
Offsite Transportation - Solids	103757.5	miles	$3.25	$337,212	$0	5390.6 tons @ 20 tons/load = 269.5 loads @ 385 miles/trip = 103757.5 miles	Rate: transporters quote/site experience
Subt - FAC 1/2 to Offsite Landfill				**$337,212**	**$0**	*transport soils & sediments from FAC Pond 1/2 to offsite landfill*	
6.02.14 Transp/Unload FAC 1/2: Onsite Disp						production rate = 0.5 hours for onsite travel	
Driver	224.6	hours	$45.00	$0	$10,107	5390.6 tons @ 12 tons/load = 449.2 loads @ 0.5 hours/trip = 224.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (12-ton load)	224.6	hours	$24.78	$0	$5,566	5390.6 tons @ 12 tons/load = 449.2 loads @ 0.5 hours/trip = 224.6 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Subt - FAC 1/2 to Onsite Landfill				**$0**	**$15,673**	*onsite disposal of stabilized sediment*	
6.02.15 Offsite FAC 1/2 Disposal						if onsite landfill capacity not available	
Offsite Disposal - FAC 1/2 Soil/Sed	5390.6	tons	$133.00	$716,950	$0	5390.6 tons	HWC/ETC 2004 & CWM 2011 cost comparison industry pricing based on current market conditions
Subt - Offsite Landfill Disposal				**$716,950**	**$0**	*offsite disposal of soils & sediments from FAC Pond 1/2*	
(Subt: Assemblies 6.02.11 thru 6.02.15)				**$1,215,261**	**$176,772**	*excavation, stabilization, and T&D for FAC Pond 1/2 soils & sediments*	

6.02 Fac Ponds (Fac 1&2, 3, and New 5)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.02.16 Excavate Soil/Sed - FAC 3						production rate = 100 CY/hour, includes loading & transport to stabilization:site experience	
FAC Pond 3 Area in SF x 0.5' dp	495500.0	*SF*	n/a			*247750 CF = 9176 CY*	
Laborer	91.8	hours	$39.00	$3,580	$3,580	9175.9 CY @ 100 CY/hr= 91.8 hours @ 1 units/crew= 91.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	91.8	hours	$45.00	$4,131	$4,131	9175.9 CY @ 100 CY/hr = 91.8 hours @ 1 units/crew = 91.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Excavator	91.8	hours	$84.09	$7,719	$7,719	9175.9 CY @ 100 CY/hr = 91.8 hours @ 1 units/crew = 91.8 hours	RSM/HC p. 467 (line item 01 54 33 20 0320)
Driver	91.8	hours	$45.00	$4,131	$4,131	9175.9 CY @ 100 CY/hr = 91.8 hours @ 1 units/crew = 91.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (12-ton load)	91.8	hours	$24.78	$2,275	$2,275	9175.9 CY @ 100 CY/hr = 91.8 hours @ 1 units/crew = 91.8 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Subt - Excavate Soil/Sed - FAC 3				**$21,836**	**$21,836**	*excavate soils and sediments from FAC Pond 3*	
6.02.17 Stabilize FAC Pond 3						production rate = 100 tons/hour = 800 tons/day; includes loading for transport to landfill	
PROCESS TONS (incl kiln dust)	14245.6	*TONS*	n/a			*9176 CY @ 1.35 ton/CY + 15% kiln dust = 14245.6 tons*	1 CY = 2,700# (1.35 ton) @ 100# per CF
Dump Truck (12-ton load)	142.5	hours	24.78	$3,531	$3,531	14245.6 tons @ 100 tons/hr @ 142.5 hours @ 1 units/crew = 142.5 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Cement Kiln Dust - Mat'l&Delv Cost	1858.1	tons	$48.00	$89,189	$89,189	9176 CY @ 1.35 ton/CY @ 15% kiln dust = 1858.1 tons	CWM actual 2011 costs
Stabilization Cost	12387.6	tons	$25.00	$309,690	$309,690	9176 CY @ 1.35 ton/CY = 12387.6	CWM actual 2011 costs inc. labor & equipment
TCLP (Metals/VOCs/Semi-VOCs)	11.9	each	$446.67	$5,315	$5,315	474.9 hours @ 1 test/40 hr = 11.9 tests	analytical price: average of three quotes
Subt - Stabilize FAC Pond 3				**$407,725**	**$407,725**	*stabilize soils and sediments from FAC Pond 3*	
6.02.18 Transp FAC 3: Offsite Disp						production rate = 0.5 hours/rolloff for on-site travel	
Offsite Transportation - Solids	274235.5	miles	$3.25	$891,265	$0	14245.6 tons @ 20 tons/load = 712.3 loads @ 1385 hours/trip = 274,235.5 miles	Rate: transporters quote/site experience
Subt - FAC 3 to Offsite Landfill				**$891,265**	**$0**	*transport soils & sediments from FAC Pond 3 to offsite landfill*	
6.02.19 Transp/Unload FAC 3: Onsite Disp						production rate = 0.5 hours for onsite travel	
Driver	593.6	hours	$45.00	$0	$26,712	14245.6 tons @ 12 tons/load = 1187.1 loads @ 0.5 hours/trip = 593.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (12-ton load)	593.6	hours	$24.78	$0	$14,709	14245.6 tons @ 12 tons/load = 1187.1 loads @ 0.5 hours/trip = 593.6 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Subt - FAC 3 to Onsite Landfill				**$0**	**$41,421**	*onsite disposal of stabilized sediment*	
6.02.20 Offsite FAC 3 Disposal						in-house estimate = $0 for on-site disposal	
Disposal - FAC 3 Soil/Sediments	14245.6	tons	$133.00	$1,894,665	$0	14245.6 tons	HWC/ETC 2004 & CWM 2011 cost comparison industry pricing based on current market conditions
Subt - Offsite Landfill Disposal				**$1,894,665**	**$0**	*offsite disposal of soils & sediments from FAC Pond 3*	
(Subt: Assemblies 6.02.16 thru 6.02.20)				**$3,215,492**	**$470,983**	*excavation, stabilization, and T&D for FAC Pond 3 soils & sediments*	
6.02.21 Excavate Soil - FAC 5							
(Subt: Assemblies 6.02.21)				**$0**	**$0**	*Fac Pond 5 Clay liner assumed to be clean and left in place*	
6.02.22 Backfill/Grade - FAC 1/2						production rate = 200 CY/hour, site experience w/ 2 dozers; 11,000 CY onsite soil/clay available from berms	
FAC Pond 1/2 Backfill Volume	31250.0	*CY*	n/a			*31250 CY minus 11000 CY onsite = 20250 CY borrow*	
Laborer	156.3	hours	$39.00	$6,094	$6,094	31250 CY @ 200 CY/hr= 156.25 hours @ 1 units/crew= 156.25 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	312.5	hours	$45.00	$14,063	$14,063	31250 CY @ 200 CY/hr= 156.25 hours @ 2 units/crew = 312.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dozer (200 hp)	312.5	hours	$56.38	$17,619	$17,619	31250 CY @ 200 CY/hr= 156.25 hours @ 2 units/crew = 312.5 hours	RSM/HC p. 468 (line item 01 54 33 20 4260)
Offsite Borrow - Material & Delivery Cost	20250.0	CY	$11.00	$222,750	$222,750	20250 CY	3rd party quote for RMU-1 final cover construction Assb. 14.0
Subt - Backfill/Grade - FAC 1/2				**$260,525**	**$260,525**	*backfill and grade FAC Pond 1/2*	
6.02.23 Backfill/Grade - FAC 3						production rate = 200 CY/hour, site experience w/ 2 dozers	
FAC Pond 3 Backfill Volume	137500.0	*CY*	n/a			*137500 CY minus 0 CY onsite = 137500 CY borrow*	
Laborer	687.5	hours	$39.00	$26,813	$26,813	137500 CY @ 200 CY/hr = 687.5 hours @ 1 units/crew = 687.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	1375.0	hours	$45.00	$61,875	$61,875	137500 CY @ 200 CY/hr = 687.5 hours @ 2 units/crew = 1375.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dozer (200 hp)	1375.0	hours	$56.38	$77,523	$77,523	137500 CY @ 200 CY/hr = 687.5 hours @ 2 units/crew = 1375.0 hours	RSM/HC p. 468 (line item 01 54 33 20 4260)
Offsite Borrow - Material & Delivery Cost	137500.0	CY	$11.00	$1,512,500	$1,512,500	137500 CY	3rd party quote for RMU-1 final cover construction Assb. 14.0
Subt - Backfill/Grade - FAC 3				**$1,678,710**	**$1,678,710**	*backfill and grade FAC Pond 3*	

6.02 Fac Ponds (Fac 1&2, 3, and New 5)

Basic Closure Activities: Direct Costs	**Estimated Quantity**	**Unit of Measure**	**Unit Price**	**2011 CWM Extended Price - Offsite Disposal**	**2011 CWM Extended Price - Onsite Disposal**	**Basis of Production and Quantities for In-house Estimate**	**In-house Pricing References**
6.02.24 Backfill/Grade - FAC 5						berms	
FAC Pond 5 Backfill Volume	58550.0	*CY*	n/a			*58550 CY* onsite berm material	
Laborer	292.8	hours	$39.00	$11,419	$11,419	58550 CY @ 200 CY/hr = 292.8 hours @ 1 units/crew = 292.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	585.6	hours	$45.00	$26,352	$26,352	58550 CY @ 200 CY/hr = 292.8 hours @ 2 units/crew = 585.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dozer (200 hp)	585.6	hours	$56.38	$33,016	$33,016	58550 CY @ 200 CY/hr = 292.8 hours @ 2 units/crew = 585.6 hours	RSM/HC p. 468 (line item 01 54 33 20 4260)
Offsite Borrow - Material & Delivery Cost	0.0	CY	$11.00	$0	$0	Assumes only on-site materials will be used.	3rd party quote for RMU-1 final cover construction Assb. 14.0
Subt - Backfill/Grade - FAC 5				**$70,787**	**$70,787**	*backfill and grade FAC Pond 5*	
(Subt: Assemblies 6.02.22 thru 6.02.24)				**$2,010,022**	**$2,010,022**	*backfill and grade FAC Ponds 1/2, 3, and 5*	
6.02.25 Seed/Fertilize FAC 1/2 3 & 5						soil prep prod' rate = 33K sf/day (0.75 ac/day); seed/fert prod'n rate = 80K sf/day (1.8 ac/day)	
FAC Pond 1/2 Surface Area	309.3	*MSF*	*n/a*			*7.1 acres*	
FAC Pond 3 Surface Area	575.0	*MSF*	*n/a*			*13.2 acres*	
FAC Pond 5 Surface Area	326.7	*MSF*	*n/a*			*7.5 acres*	
Soil Preparation	0.0	MSF	$0.00	$0	$0	Not necessary	
Seeding & Fertilizing	1211.0	MSF	$73.97	$89,578	$89,578	1211 MSF	2004 DEC Rate * Implicit Deflator
Subt - Seed/Fert FACs 1/2, 3, & 5				**$89,578**	**$89,578**	*seeding and fertilizing FAC Ponds 1/2, 3, and 5*	
(Subt: Assemblies 6.02.25)				**$89,578**	**$89,578**	seeding and fertilizing FAC Ponds 1/2, 3, and 5	
6.02.26 GW Well Monitoring						production = 0.5 hours/sample for two techs	
Technician	26.0	hours	$38.00	$988	$988	26.0 samp @ 0.5 hrs/samp = 13.0 hours @ 2 units/crew = 26.0 hours	technician rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	26.0	samp	$25.00	$650	$650	26.0 samples	bottles, shipping supplies
VOC Analysis (EPA 624)	26.0	samp	$105.00	$2,730	$2,730	26.0 points @ 1.0 samps/pt = 26.0 samples	analytical price: average of three quotes
Subt - GW Well Monitoring				**$4,368**	**$4,368**	*monitoring of ten (10) monitoring wells (plus three QA blanks/duplicates) - two events during one year closure*	
(Subt: Assemblies 6.02.26)				**$4,368**	**$4,368**		
Total Non-Super hours	7780.7						
6.02.27 PPE Usage & H&S Planning						Level C @ 0%; Level Mod C @ 25%; Level D @ 75% for tot non-supv hrs for all tasks; HASP @ 2.5% of non-supv hrs	
PPE Usage - Level D	729.5	days	$0.00	$0	$0	7780.7 hours @ 8 hr/day = 972.6 days @ 75% "D" days = 729.5 days	Standard Work Clothes - Site Experience
PPE Usage - Mod Level C	243.1	days	$9.00	$2,188	$2,188	7780.7 hours @ 8 hr/day = 972.6 days @ 25% "C" days = 243.1 days	25% of non-supv hrs in Mod Level C (price: $9/day)
PPE Usage - Level C	0.0	days	$25.00	$0	$0	7780.7 hours @ 8 hr/day = 972.6 days @ 0% "C" days = 0.0 days	0% of non-supv hrs in Level C (price: $25/day)
Health & Safety Officer	194.5	hours	$75.00	$14,588	$14,588	7780.7 hours @ 2.5% hr/hr = 194.5 hours	Safety Eng Rate: rate 2011 3rd party quote
Subt - PPE Usage/H&S Planning				**$16,775**	**$16,775**		
6.02.28 Supervision						26 weeks for closure of FAC Ponds	
Foreman	1040.0	hours	$65.00	$67,600	$67,600	26 weeks @ 40 hrs/wk = 1040.0 hours	Foreman rate 2011 3rd party quote
Site Project Manager	0.0	hours	$75.00	$0	$0	Included in Gen'l Contractor G&A/Home Office indirect costs	loaded labor rate: loaded labor rate 2011 3rd party quote
Subtotal - Supervision				**$67,600**	**$67,600**		
6.02.29 Certification						Engineer @ 1.5% and Clerical @ 1.5% of total non-supervisory labor hours for all tasks	
Engineer	116.7	hours	$130.00	$15,171	$15,171	7780.7 hours @ 0.015 hr/hr = 116.7 hours	Engineer rate: 2011 3rd party quote
Clerical	116.7	hours	$45.00	$5,252	$5,252	7780.7 hours @ 0.015 hr/hr = 116.7 hours	Clerical rate: 2011 3rd party quote
Subtotal - Certification				**$20,423**	**$20,423**		
(Subt: Assemblies 6.02.27 thru 6.02.29)				**$104,798**	**$104,798**	*supervision, health & safety, and certification*	
6.02 Fac Ponds	**Direct Cost**	**Total**	**Basic**	**$6,920,591**	**$3,137,594**		

6.02 Fac Ponds (Fac 1&2, 3, and New 5)

Total Cost Summary

Cost Category	Proposed Percent of Direct Cost	Proposed 2011 Cost OffSite Disposal	Cost Range
Direct Costs/Basic Disposal		$6,920,591	
Plus Indirect Costs/Profit:			
Site Activity Management Costs	7.00%	$484,441	note: DEC uses 7%
Gen'l Contractor G&A/Home Office	4.00%	$276,824	note: DEC uses 4%
Pre-Construction Design Costs	6.00%	$415,235	note: DEC uses 6%
Engineering During Construction	2.00%	$138,412	note: DEC uses 2%
General Contractor Profit	6.00%	$415,235	Note DEC adds 6%
Indirect Costs/Basic Disposal	25.00%	$1,730,148	
Subt: Fac Ponds		$8,650,739	
Plus Contingency	10.00%	$865,074	CWM and DEC 10%
Tot: Fac Ponds		$9,515,813	

Cost References:
"RSM/HC" refers to the RSMeans "Heavy Construction Cost Data", 2009 Edition (rates adjusted for inflation)
"RSM/UP" refers to the RSMeans "Environmental Remediation Cost Data - Unit Price", 2004 Edition (rates adjusted for inflation)
"RSM/BC" refers to the RSMeans "Building Construction Cost Data", 2003 Edition (rates adjusted for inflation)

6.03 Fac Ponds (Fac 1&2, 3, and New 5)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.03.1 Inventory Verification						production rate: 0.5 hour/pond to take depth estimate and estimate volume; two persons required	
Laborer	2.0	hours	$39.00	$78	$78	2 ponds @ 0.5 hr/pond = 1.0 hours @ 2 units/crew = 2.0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
Subtotal - Inventory Verification				**$78**	**$78**		
(Subt: Assemblies 6.03.1)				**$78**	**$78**	*inventory of liquid volumes in Ponds 1/2 & 5*	
6.03.2 Ponds' Sampling & Analysis						production rate = 2.0 hours per composite sample for a three-person crew	
Batch Sampling Events						*2 events @ 3 samp/evnt= 6 samples*	sampling & analysis prior to pond discharge
Technician	36.0	hours	$38.00	$1,368	$1,368	6 samps @ 2.0 hrs/samp = 12.0 hours @ 3 units/crew = 36.0 hours	technician rate: rate 2011 3rd party quote
Sampling Equipment	12.0	hours	$25.00	$300	$300	6 samps @ 2.0 hrs/samp = 12.0 hours @ 1 units/crew = 12.0 hours	boat, samplers, meters, etc.
Sampling Supplies	6.0	samp	$25.00	$150	$150	6 samples	bottles, shipping supplies
pH	6.0	samp	$10.67	$64	$64	6 samples	analytical price: average of three quotes
Specific Conductance	6.0	samp	$13.33	$80	$80	6 samples	analytical price: average of three quotes
Temperature	6.0	samp	-	$0	$0	6 samples obtained using field equipment	Obtained using field equipment
Dissolved Oxygen	6.0	samp	-	$0	$0	6 samples obtained using field equipment	Obtained using field equipment
Total Dissolved solids (TDS)	6.0	samp	$15.00	$90	$90	6 samples	analytical price: average of three quotes
TDVS (total dissolved volatile solids)	6.0	samp	$23.33	$140	$140	6 samples	analytical price: average of three quotes
Alkalinity as CaCO3	6.0	samp	$15.33	$92	$92	6 samples	analytical price: average of three quotes
TOC	6.0	samp	$31.67	$190	$190	6 samples	analytical price: average of three quotes
Ca/Mg Hardness (200.7)	6.0	samp	$24.33	$146	$146	6 samples	analytical price: average of three quotes
Total Suspended Solids (TSS)	6.0	samp	$13.33	$80	$80	6 samples	analytical price: average of three quotes
Settleable Solids	6.0	samp	$13.33	$80	$80	6 samples	analytical price: average of three quotes
Ammonia (NH3)	6.0	samp	$22.67	$136	$136	6 samples	analytical price: average of three quotes
Phosphorous	6.0	samp	$20.00	$120	$120	6 samples	analytical price: average of three quotes
TON (TKN-NH3)	6.0	samp	$41.67	$250	$250	6 samples	analytical price: average of three quotes
Cyanide	6.0	samp	$35.00	$210	$210	6 samples	analytical price: average of three quotes
Sulfates	6.0	samp	$21.00	$126	$126	6 samples	analytical price: average of three quotes
Sulfides	6.0	samp	$25.00	$150	$150	6 samples	analytical price: average of three quotes
Surfactants (MBAS)	6.0	samp	$28.33	$170	$170	6 samples	analytical price: average of three quotes
BOD-5	6.0	samp	$30.00	$180	$180	6 samples	analytical price: average of three quotes
Fluoride	6.0	samp	$19.33	$116	$116	6 samples	analytical price: average of three quotes
Chlorine	6.0	samp	$19.33	$116	$116	6 samples	analytical price: average of three quotes
Residual Chlorine	6.0	samp	$15.00	$90	$90	6 samples	analytical price: average of three quotes
NO2	6.0	samp	$21.00	$126	$126	6 samples	analytical price: average of three quotes
NO3	6.0	samp	$19.33	$116	$116	6 samples	analytical price: average of three quotes
VOCs (624)	6.0	samp	$105.00	$630	$630	6 samples	analytical price: average of three quotes
Semi-volatile organics (625)	6.0	samp	$208.33	$1,250	$1,250	6 samples	analytical price: average of three quotes
Pesticides/PCBs (608) (MDL 65 PPT (ng/l))	6.0	samp	$133.33	$800	$800	6 samples	analytical price: average of three quotes
Oil & Grease (1631)	6.0	samp	$21.67	$130	$130	6 samples	analytical price: average of three quotes
total Phenols	6.0	samp	$26.67	$160	$160	6 samples	analytical price: average of three quotes
Priority Pollutant Metals (200.7) *	6.0	samp	$188.00	$1,128	$1,128	6 samples	analytical price: average of three quotes
Mercury (245.1)	6.0	samp	$25.00	$150	$150	6 samples	analytical price: average of three quotes
Mercury (1631B)	6.0	samp	$111.67	$670	$670	6 samples	analytical price: average of three quotes
Acute Toxicity/Bioassy	2.0	samp	$3,800.00	$7,600	$7,600	2 samples	One quote: actual cost for 2010
Subt - Ponds' Sampling & Analysis				**$17,204**	**$17,204**	*two pond discharges (batches) requiring sampling & analysis*	Fac Pond 8 out of service empty

6.03 Fac Ponds (Fac 1&2, 3, and New 5)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.03.3 S&A Certification & Report						one event per year for divers to check discharge pipe; two 40-hour predischarge qualification reports	
Divers (Sr. Technicians)	0.0	hours	$0.00	$0	$0	Included in underwater inspection below	
SCBA Gear (2 units)	0.0	hours	$0.00	$0	$0	Included in underwater inspection below	
Laborer (Surface Support)	0.0	hours	$0.00	$0	$0	Included in underwater inspection below	
Underwater Inspection	1.0	each	$4,000.00	$4,000	$4,000	$4,000 per event @ 1 event per year	Based on 2010 site rate of $3,500
Engineer (Report)	80.0	hours	$130.00	$10,400	$10,400	2 events @ 40 hrs/event = 80.0 hours @ 1 units/crew = 80.0 hours	Eng Rate: rate 2011 3rd party quote
Subt - S&A Cert'n & Report				**$14,400**	**$14,400**	*diver(s) to check discharge pipe; also engineer's predischarge qualification report*	Fac Pond 8 out of service empty
(Subt: Assemblies 6.03.2 thru 6.03.3)				**$31,604**	**$31,604**		
6.03.4 Empty (Pump) FAC Pond 1/2						prod'n rate = 960,000 gals/day = 60,000 gals/hr = 1,000 gals/min per facility est @ 16 hrs/day O&M	
FAC Pond 1/2 Inventory in Gallons	*22881000.0*	*gals*	*n/a*			*381.4 total hours req'd to pump*	*Fac Pond 1/2 = 22,881,000 gallons*
AWTS Tech'n (8-hr day shift/straight time)	190.7	day hrs	$65.00	$12,396	$12,396	381.4 tot hrs @ 50% (day shift) = 190.7 hours @ 1 units/crew = 190.7 hours	technician rate: rate 2011 3rd party quote
AWTS Tech'n (8-hr night shift/straight time)	190.7	nite hrs	$65.00	$12,396	$12,396	381.4 tot hrs @ 50% (night shift) = 190.7 hours @ 1 units/crew = 190.7 hours	technician rate: rate 2011 3rd party quote
AWTS Supervisor (day shift only)		day hrs	$85.00	$0	$0	Supervisor included in 6.25 below	
Maintenance (day shift only)	114.4	day hrs	$45.00	$5,148	$5,148	381.4 tot hrs @ 30% (total hrs) = 114.4 hours @ 1 units/crew = 114.4 hours	maintenance rate: rate 2011 3rd party quote
Tech/Sampler (day shift only)	38.1	day hrs	$38.00	$1,448	$1,448	381.4 tot hrs @ 10% (total hrs) = 38.1 hours @ 1 units/crew = 38.1 hours	technician rate: rate 2011 3rd party quote
Engineer (day shift only)		day hrs	$90.00	$0	$0	Engineer included in 6.25 below	
Settleable Solids	95.4	samp	$13.33	$1,272	$1,272	381.4 tot hrs @ 1 samp/4.0 hrs = 95.4 samples	analytical price: average of three quotes
Dissolved Oxygen	1.7	samp	-	$0	$0	381.4 tot hrs @ 1 samp/2 wks = 1.7 samples Field Measurement	analytical price: average of three quotes
Sulfide (total)	1.7	samp	$25.00	$43	$43	381.4 tot hrs @ 1 samp/2 wks = 1.7 samples	analytical price: average of three quotes
Discharge Pump (6"/1,000 gal/min)	381.4	total hrs	$12.34	$4,706	$4,706	381.4 tot hrs @ 100% total time = 381.4 hours @ 1 units/crew = 381.4 hours	RSM/HC p. 475 (line item 01 54 33 70 1300)
Discharge Pipe (6" Diam/3,000 LF)	1144050.0	foot-hrs	$0.0110	$12,585	$12,585	381.4 tot hrs @ 100% total time = 381.4 hours @ 3000 LF/crew = 1144050 foot-hrs	RSM/HC p. 475 (line item 01 54 33 70 0300)
Subtotal - Pump FAC Pond 1/2				**$49,992**	**$49,992**	*transfer contents of FAC Pond 1/2 to discharge pipe to Niagara River (3,000 ft)*	
6.03.5 Transfer (Pump) FAC Pond 5						prod'n rate = 960,000 gals/day = 60,000 gals/hr = 1,000 gals/min per facility est @ 16 hrs/day O&M	
FAC Pond 5 Inventory in Gallons	24700000.0	*gals*	*n/a*			*412 total hours req'd to pump* 24700000gal/60000gal/hr = 412hr	*Fac Pond 5= 24,700,000 gallons*
AWTS Tech'n (8-hr day shift/straight time)	206.0	day hrs	$65.00	$13,390	$13,390	412 tot hrs @ 50% (day shift) = 206 hours @ 1 units/crew = 206 hours	technician rate: rate 2011 3rd party quote
AWTS Tech'n (8-hr night shift/straight time)	206.0	nite hrs	$65.00	$13,390	$13,390	412 tot hrs @ 50% (night shift) = 206 hours @ 1 units/crew = 206 hours	technician rate: rate 2011 3rd party quote
AWTS Supervisor (day shift only)		day hrs	$85.00	$0	$0	Supervisor included in 6.01.28 below	
Maintenance (day shift only)	123.6	day hrs	$45.00	$5,562	$5,562	412 tot hrs @ 30% (total hrs) = 123.6 hours @ 1 units/crew = 123.6 hours	maintenance rate: rate 2011 3rd party quote
Tech/Sampler (day shift only)	41.2	day hrs	$38.00	$1,566	$1,566	412 tot hrs @ 10% (total hrs) = 41.2 hours @ 1 units/crew = 41.2 hours	technician rate: rate 2011 3rd party quote
Engineer (day shift only)		day hrs	$90.00	$0	$0	Engineer included in 6.01.28 below	
Settleable Solids	103.0	samp	$13.33	$1,373	$1,373	412 hours @ 1.0 sample per 4.0 hours = 103 samples	analytical price: average of three quotes
Dissolved Oxygen	5.2	samp	-	$0	$0	412 hours @ 1.0 sample per 80.0 hours = 5.2 samples Field Measurement	analytical price: average of three quotes
Sulfide (total)	5.2	samp	$25.00	$130	$130	412 hours @ 1.0 sample per 80.0 hours = 5.2 samples	analytical price: average of three quotes
Discharge Pump (6"/1,000 gal/min)	412.0	total hrs	$12.34	$5,084	$5,084	412 tot hrs @ 100% total time = 412 hours @ 1 units/crew = 412 hours	RSM/HC p. 475 (line item 01 54 33 70 1300)
Discharge Pipe (6" Diam/3,000 LF)	1236000.0	foot-hrs	$0.0110	$13,596	$13,596	412 tot hrs @ 100% total time = 412 hours @ 3000 LF/crew = 1236000 foot-hrs	RSM/HC p. 475 (line item 01 54 33 70 0300)
Subtotal - Pump FAC Pond 5				**$54,091**	**$54,091**	*transfer contents of FAC Pond 5 to discharge pipe to Niagara River (3,000 ft)*	
6.03.6 Empty (Pump) FAC Pond 3						prod'n rate = 960,000 gals/day = 60,000 gals/hr = 1,000 gals/min per facility est @ 16 hrs/day O&M	
Subtotal - Pump FAC Pond 3				**$0**	**$0**	***FAC Pond 3 assumed clean closed. Precipitation that enters impoundment managed as stormwater***	
(Subt: Assemblies 6.03.4 thru 6.03.6)				**$104,083**	**$104,083**		

6.03 Fac Ponds (Fac 1&2, 3, and New 5)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.03.7 Remove Fac Pond 5 Liner System						**Ballast area assume 1.73 acres**	
FAC Pond 5 Ballast Area in SF x 1' dp	2795.0	*CY*	*n/a*			75,471 SF * 1ft. Depth / 27 = *2795 CY*	
Laborer	28.0	hours	$39.00	$1,092	$1,092	2,795 CY @ 100 CY/hr = 28.0 hours @ 1 units/crew = 28.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	28.0	hours	$45.00	$1,260	$1,260	2,795 CY @ 100 CY/hr = 28.0 hours @ 1 units/crew = 28.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Excavator	28.0	hours	$84.09	$2,355	$2,355	2,795 CY @ 100 CY/hr = 28.0 hours @ 1 units/crew = 28.0 hours	RSM/HC p. 467 (line item 01 54 33 20 0320)
Driver	28.0	hours	$45.00	$0	$1,260	2,795 CY @ 100 CY/hr = 28.0 hours @ 1 units/crew = 28.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (12-ton load) Onsite Disposal	28.0	hours	$24.78	$0	$694	2,795 CY @ 100 CY/hr = 28.0 hours @ 1 units/crew = 28.0 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Offsite Transportation - Ballast	1034.0	miles	$3.25	$3,361	$0	4136.6 tons @ 20 tons/load = 206.8 loads @ 5 miles/trip = 1034 miles	Rate: transporters quote/site experience
Offsite Disposal - FAC 5 Ballast	4136.6	tons	$27.00	$111,688	$0	Assume non-hazardous material 2795 CY * 1.48 ton/CY = 4136.6 tons	1.48 ton/CY industry standard for gravel.
Subtotal - Ballast Removal				**$119,755**	**$6,660**		Non-Haz Disposal/Site Experience
						Geosynthetic Footprint Area = 235,455 SF = 5.4 acres	
Fac Pond 5 Geo-synthetic Removal	781836.0	SF	*n/a*			5.4 acres * 43,560 SF/Acre = 235,455 SF	
EIA Geomembrane Disposal	470910.0	SF	*n/a*			2 layers @ 5.4 acres 470,910 SF @ 0.22lb/SF = 51.8 tons	1 roll = 16,100SF = 3,500lbs = 0.22lb/SF
Geocomposite Disposal	235455.0	SF	*n/a*			1 layer @ 5.4 acres 235,455 SF @ 0.41lb/SF = 48.3 tons	1 roll = 2,200 SF = 900 lbs = 0.41lb/SF
Non-woven Geotextile Disposal	75471.0	SF	*n/a*			1.73 acres (Beneath Ballast) 75,471 SF @ 0.13lb/SF = 4.9 tons	1 roll = 4,500 SF = 600lbs = 0.13lb/SF
Laborer	156.4	hours	$39.00	$6,100	$6,100	781,836 SF @ 5,000 SF/hr = 156.4 hours @ 1 units/crew = 156.4 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	156.4	hours	$45.00	$7,038	$7,038	781,836 SF @ 5,000 SF/hr = 156.4 hours @ 1 units/crew = 156.4 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Excavator	156.4	hours	$84.09	$13,152	$13,152	781,836 SF @ 5,000 SF/hr = 156.4 hours @ 1 units/crew = 156.4 hours	RSM/HC p. 467 (line item 01 54 33 20 0320)
Driver	156.4	hours	$45.00	$0	$7,038	781,836 SF @ 5,000 SF/hr = 156.4 hours @ 1 units/crew = 156.4 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (12-ton load)	156.4	hours	$24.78	$0	$3,876	781,836 SF @ 5,000 SF/hr = 156.4 hours @ 1 units/crew = 156.4 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Offsite Transportation - Geosynthetics	43.8	miles	$3.25	$142	$0	105 tons @ 12 tons/load = 8.75 loads @ 5 miles/trip = 43.75 miles	Rate: transporters quote/site experience
Offsite Disposal - FAC 5 Geosynthetics	105.0	tons	$27.00	$2,835	$0	781,836 SF = 105 tons	Non-Haz Disposal/Site Experience
Subtotal - Geosynthetic Removal				**$29,266**	**$37,203**		
(Subt: Assemblies 6.03.7)				**$149,022**	**$43,863**		

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.03.8 Soil/Sed S&A - FAC Pond 1/2							
FAC Pond 1/2 Area in SF	187500.0	*SF*	*n/a*			*18.8 areas = 19 grids: 38 metals 2 hazardous 17 organ*	Fac Pond 1/2 = 187,500 SF; grids @ 100' x 100'
Technician	114.0	hours	$38.00	$4,332	$4,332	57 samps @ 1 hrs/samp = 57.0 hours @ 2 units/crew = 114.0 hours	technician rate: rate 2011 3rd party quote
Sampling Supplies	57.0	samp	$10.00	$570	$570	57 samples	bottles, shipping supplies
USEPA 40CFR Part 264 Append IX	2.0	samp	$1,226.67	$2,453	$2,453	2 samples	analytical price: average of three quotes
Priority Poll'nt Organics (semi-VOC)	17.0	samp	$615.00	$10,455	$10,455	17 samples	analytical price: average of three quotes
Priority Pollutant Metals	38.0	samp	$158.33	$6,017	$6,017	38 samples	analytical price: average of three quotes
Subtotal - Soil/Sed S&A - FAC 1/2				**$23,827**	**$23,827**	*sampling and analyses of FAC Pond 1/2 soils and sediments*	
6.03.9 Soil/Sed S&A - FAC Pond 3						**Assumes NYSDEC approval of clean closure**	
Subtotal - Soil/Sed S&A - FAC 3				**$0**	**$0**	***sampling and analyses of FAC Pond 3 soils and sediments completed for clean closure***	
6.03.10 Soil/Sed S&A - FAC Pond 5							
FAC Pond 5 Area in SF	235455.0	*SF*	*n/a*			5.9 *areas =* 6 grids: 12 metals 2 hazardous 4 organ	Fac Pond 5 = 235,455 SF; grids @ 200' x 200'
Technician	36.0	hours	$38.00	$1,368	$1,368	18 samps @ 1 hrs/samp = 18 hours @ 2 units/crew = 36 hours	technician rate: rate 2011 3rd party quote
Sampling Supplies	18.0	samp	$10.00	$180	$180	18 samps @ Sample counts per Fac Pond Closure Plan	bottles, shipping supplies
USEPA 40CFR Part 264 Append IX	2.0	samp	$1,226.67	$2,453	$2,453	2 samples	analytical price: average of three quotes
Priority Poll'nt Organics (semi-VOC)	4.0	samp	$615.00	$2,460	$2,460	7 samples	analytical price: average of three quotes
Priority Pollutant Metals	12.0	samp	$158.33	$1,900	$1,900	18 samples	analytical price: average of three quotes
Subtotal - Soil/Sed S&A - FAC 5				**$8,361**	**$8,361**	*sampling and analyses of FAC Pond 5 clay liner*	
(Subt: Assemblies 6.03.8 thru 6.03.10)				**$32,188**	**$32,188**	*sampling and analyses of soils and sediments from FAC Ponds 1/2 and 5*	

6.03 Fac Ponds (Fac 1&2, 3, and New 5)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.03.11 Excavate Soil/Sed - FAC 1/2						production rate = 100 CY/hour, includes loading & transport to stabilization:site experience	
FAC Pond 1/2 Area in SF x 0.5' dp	187500.0	*SF*	*n/a*			*93750 CF = 3472 CY*	
Laborer	34.7	hours	$39.00	$1,353	$1,353	3472.2 CY @ 100 CY/hr = 34.7 hours @ 1 units/crew = 34.7 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	34.7	hours	$45.00	$1,562	$1,562	3472.2 CY @ 100 CY/hr = 34.7 hours @ 1 units/crew = 34.7 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Excavator	34.7	hours	$84.09	$2,918	$2,918	3472.2 CY @ 100 CY/hr = 34.7 hours @ 1 units/crew = 34.7 hours	RSM/HC p. 467 (line item 01 54 33 20 0320)
Driver	34.7	hours	$45.00	$1,562	$1,562	3472.2 CY @ 100 CY/hr = 34.7 hours @ 1 units/crew = 34.7 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (12-ton load)	34.7	hours	$24.78	$860	$860	3472.2 CY @ 100 CY/hr = 34.7 hours @ 1 units/crew = 34.7 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Subt - Excavate Soil/Sed - FAC 1/2				**$8,254**	**$8,254**	*excavate soils and sediments from FAC Pond 1/2*	
6.03.12 Stabilize FAC Pond 1/2						production rate = 100 tons/hour = 800 tons/day; includes loading for transport to landfill	
PROCESS TONS (incl kiln dust)	5390.6	*TONS*	n/a			*3472 CY @ 1.35 ton/CY + 15% kiln dust = 5390.6 tons*	1 CY = 2,700# (1.35 ton) @ 100# per CF
Dump Truck (12-ton load)	53.9	hours	24.78	$1,336	$1,336	5390.6 tons @ 100 tons/hr @ 53.9 hours @ 1 units/crew = 53.9 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Cement Kiln Dust - Mat'l&Delv Cost	703.1	tons	$48.00	$33,749	$33,749	3472 CY @ 1.35 ton/CY @ 15% kiln dust = 703.1 tons	CWM actual 2011 costs
Stabilization Cost	4687.2	tons	$25.00	$117,180	$117,180	*3472 CY @ 1.35 ton/CY =* 4687.2 tons	CWM actual 2011 costs inc. labor & equipment
TCLP (Metals/VOCs/Semi-VOCs)	1.3	each	$446.67	$581	$581	53.9 hours @ 1 test/40 hr = 1.3 tests	analytical price: average of three quotes
Subt - Stabilize FAC Pond 1/2				**$152,845**	**$152,845**	*stabilize soils and sediments from FAC Pond 1/2*	
6.03.13 Transp FAC 1/2: Offsite Disp						production rate = 0.5 hours/rolloff for on-site travel	
Offsite Transportation - Solids	103757.5	miles	$3.25	$337,212	$0	5390.6 tons @ 20 tons/load = 269.5 loads @ 385 miles/trip = 103757.5 miles	Rate: transporters quote/site experience
Subt - FAC 1/2 to Offsite Landfill				**$337,212**	**$0**	*transport soils & sediments from FAC Pond 1/2 to offsite landfill*	
6.03.14 Transp/Unload FAC 1/2: Onsite Disp						production rate = 0.5 hours for onsite travel	
Driver	224.6	hours	$45.00	$0	$10,107	5390.6 tons @ 12 tons/load = 449.2 loads @ 0.5 hours/trip = 224.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (12-ton load)	224.6	hours	$24.78	$0	$5,566	5390.6 tons @ 12 tons/load = 449.2 loads @ 0.5 hours/trip = 224.6 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Subt - FAC 1/2 to Onsite Landfill				**$0**	**$15,673**	*onsite disposal of stabilized sediment*	
6.03.15 Offsite FAC 1/2 Disposal						if onsite landfill capacity not available	
Offsite Disposal - FAC 1/2 Soil/Sed	5390.6	tons	$133.00	$716,950	$0	5390.6 tons	HWC/ETC 2004 & CWM 2011 cost comparison industry pricing based on current market conditions
Subt - Offsite Landfill Disposal				**$716,950**	**$0**	*offsite disposal of soils & sediments from FAC Pond 1/2*	
(Subt: Assemblies 6.03.11 thru 6.03.15)				**$1,215,261**	**$176,772**	*excavation, stabilization, and T&D for FAC Pond 1/2 soils & sediments*	

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.03.16 Excavate Soil/Sed - FAC 3						production rate = 100 CY/hour, includes loading & transport to stabilization:site experience	**Assumes Sitewide Permit Modified for construction of RMU-2**
Subt - Excavate Soil/Sed - FAC 3				**$0**	**$0**	***excavate soils and sediments from FAC Pond 3 not necessary***	
6.03.17 Stabilize FAC Pond 3						production rate = 100 tons/hour = 800 tons/day; includes loading for transport to landfill	
Subt - Stabilize FAC Pond 3				**$0**	**$0**	***stabilize soils and sediments from FAC Pond 3 not necessary***	
6.03.18 Transp FAC 3: Offsite Disp						production rate = 0.5 hours/rolloff for on-site travel	
Subt - FAC 3 to Offsite Landfill				**$0**	**$0**	***transport soils & sediments from FAC Pond 3 to offsite landfill not necessary***	
6.03.19 Transp/Unload FAC 3: Onsite Disp						production rate = 0.5 hours for onsite travel	
Subt - FAC 3 to Onsite Landfill				**$0**	**$0**	***onsite disposal of stabilized sediment not necessary***	
6.03.20 Offsite FAC 3 Disposal						in-house estimate = $0 for on-site disposal	
Subt - Offsite Landfill Disposal				**$0**	**$0**	***backfill and grade FAC Pond 3 not necessary. Area used for Cells 17, 18, & 19 of RMU-2***	
(Subt: Assemblies 6.03.16 thru 6.03.20)				**$0**	**$0**	*excavation, stabilization, and T&D for FAC Pond 3 soils & sediments*	

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.03.21 Excavate Soil - FAC 5							
(Subt: Assemblies 6.03.21)				**$0**	**$0**	*Fac Pond 5 Clay liner assumed to be clean and left in place*	

6.03 Fac Ponds (Fac 1&2, 3, and New 5)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
6.03.22 Backfill/Grade - FAC 1/2						production rate = 200 CY/hour, site experience w/ 2 dozers; 11,000 CY onsite soil/clay available from berms	
FAC Pond 1/2 Backfill Volume	31250.0	*CY*	n/a			*31250 CY minus 11000 CY onsite = 20250 CY borrow*	
Laborer	156.3	hours	$39.00	$6,094	$6,094	31250 CY @ 200 CY/hr= 156.25 hours @ 1 units/crew= 156.25 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	312.5	hours	$45.00	$14,063	$14,063	31250 CY @ 200 CY/hr= 156.25 hours @ 2 units/crew = 312.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dozer (200 hp)	312.5	hours	$56.38	$17,619	$17,619	31250 CY @ 200 CY/hr= 156.25 hours @ 2 units/crew = 312.5 hours	RSM/HC p. 468 (line item 01 54 33 20 4260)
Offsite Borrow - Material & Delivery Cost	20250.0	CY	$11.00	$222,750	$222,750	20250 CY	3rd party quote for RMU-1 final cover construction Assb. 14.0
Subt - Backfill/Grade - FAC 1/2				**$260,525**	**$260,525**	*backfill and grade FAC Pond 1/2*	
6.03.23 Backfill/Grade - FAC 3							
Subt - Backfill/Grade - FAC 3				**$0**	**$0**	*FAC Pond 3 will not be backfilled due to RMU-2 expansion.*	
6.03.24 Backfill/Grade - FAC 5						berms	
FAC Pond 5 Backfill Volume	58550.0	*CY*	n/a			*58550 CY* onsite berm material	
Laborer	292.8	hours	$39.00	$11,419	$11,419	58550 CY @ 200 CY/hr = 292.8 hours @ 1 units/crew = 292.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	585.6	hours	$45.00	$26,352	$26,352	58550 CY @ 200 CY/hr = 292.8 hours @ 2 units/crew = 585.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dozer (200 hp)	585.6	hours	$56.38	$33,016	$33,016	58550 CY @ 200 CY/hr = 292.8 hours @ 2 units/crew = 585.6 hours	RSM/HC p. 468 (line item 01 54 33 20 4260)
Offsite Borrow - Material & Delivery Cost	0.0	CY	$11.00	$0	$0	Assumes only on-site materials will be used.	3rd party quote for RMU-1 final cover construction Assb. 14.0
Subt - Backfill/Grade - FAC 5				**$70,787**	**$70,787**	*backfill and grade FAC Pond 5*	
(Subt: Assemblies 6.03.22 thru 6.03.24)				**$331,312**	**$331,312**	*backfill and grade FAC Ponds 1/2 and 5*	

6.03.25 Seed/Fertilize FAC 1/2 & 5						soil prep prod' rate = 33K sf/day (0.75 ac/day); seed/fert prod'n rate = 80K sf/day (1.8 ac/day)	
FAC Pond 1/2 Surface Area	309.3	*MSF*	*n/a*			*7.1 acres*	
FAC Pond 3 Surface Area	0.0	*MSF*	*n/a*			*0 acres* **FAC Pond 3 will not need seed/fert due to RMU-2 expansion**	
FAC Pond 5 Surface Area	326.7	*MSF*	*n/a*			*7.5 acres*	
Soil Preparation	0.0	MSF	$0.00	$0	$0	Not necessary	
Seeding & Fertilizing	636.0	MSF	$73.97	$47,045	$47,045	636 MSF	2004 DEC Rate * Implicit Deflator
Subt - Seed/Fert FACs 1/2 & 5				**$47,045**	**$47,045**	*seeding and fertilizing FAC Ponds 1/2 and 5*	
(Subt: Assemblies 6.03.25)				**$47,045**	**$47,045**	seeding and fertilizing FAC Ponds 1/2 and 5	

6.03.26 GW Well Monitoring						production = 0.5 hours/sample for two techs	
Technician	20.0	hours	$38.00	$760	$760	20.0 samp @ 0.5 hrs/samp = 10.0 hours @ 2 units/crew = 20.0 hours	technician rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	20.0	samp	$25.00	$500	$500	20.0 samples	bottles, shipping supplies
VOC Analysis (EPA 624)	20.0	samp	$105.00	$2,100	$2,100	20.0 points @ 1.0 samps/pt = 20.0 samples	analytical price: average of three quotes
Subt - GW Well Monitoring				**$3,360**	**$3,360**	*monitoring of seven monitoring wells (plus three QA blanks/duplicates) - two events during one year closure*	
(Subt: Assemblies 6.03.26)				**$3,360**	**$3,360**		

Total Non-Super hours 3547.8

6.03.27 PPE Usage & H&S Planning						Level C @ 0%; Level Mod C @ 25%; Level D @ 75% for tot non-supv hrs for all tasks; HASP @ 2.5% of non-supv hrs	
PPE Usage - Level D	332.6	days	$0.00	$0	$0	3547.8 hours @ 8 hr/day = 443.5 days @ 75% "D" days = 332.6 days	Standard Work Clothes - Site Experience
PPE Usage - Mod Level C	110.9	days	$9.00	$998	$998	3547.8 hours @ 8 hr/day = 443.5 days @ 25% "C" days = 110.9 days	25% of non-supv hrs in Mod Level C (price: $9/day)
PPE Usage - Level C	0.0	days	$25.00	$0	$0	3547.8 hours @ 8 hr/day = 443.5 days @ 0% "C" days = 0.0 days	0% of non-supv hrs in Level C (price: $25/day)
Health & Safety Officer	88.7	hours	$75.00	$6,653	$6,653	3547.8 hours @ 2.5% hr/hr = 88.7 hours	Safety Eng Rate: rate 2011 3rd party quote

6.03 Fac Ponds (Fac 1&2, 3, and New 5)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
Subt - PPE Usage/H&S Planning				**$7,651**	**$7,651**		
6.03.28 Supervision						18 weeks for closure of FAC Ponds	
Foreman	720.0	hours	$65.00	$46,800	$46,800	18 weeks @ 40 hrs/wk = 720 hours	Foreman rate 2011 3rd party quote
Site Project Manager	0.0	hours	$75.00	$0	$0	Included in Gen'l Contractor G&A/Home Office indirect costs	loaded labor rate: loaded labor rate 2011 3rd party quote
Subtotal - Supervision				**$46,800**	**$46,800**		
6.03.29 Certification						Engineer @ 1.5% and Clerical @ 1.5% of total non-supervisory labor hours for all tasks	
Engineer	53.2	hours	$130.00	$6,916	$6,916	3547.8 hours @ 0.015 hr/hr = 53.2 hours	Engineer rate: 2011 3rd party quote
Clerical	53.2	hours	$45.00	$2,394	$2,394	3547.8 hours @ 0.015 hr/hr = 53.2 hours	Clerical rate: 2011 3rd party quote
Subtotal - Certification				**$9,310**	**$9,310**		
(Subt: Assemblies 6.03.27 thru 6.03.29)				**$63,761**	**$63,761**	*supervision, health & safety, and certification*	

6.03 Fac Ponds	**Direct Cost**	**Total**	**Basic**	**$1,828,692**	**$790,202**

6.03 Fac Ponds (Fac 1&2 and New 5)

Total Cost Summary

Cost Category	Proposed Percent of Direct Cost	Proposed 2011 Cost OffSite Disposal	Cost Range
Direct Costs/Basic Disposal		$1,828,692	
Plus Indirect Costs/Profit:			
Site Activity Management Costs	7.00%	$128,008	note: DEC uses 7%
Gen'l Contractor G&A/Home Office	4.00%	$73,148	note: DEC uses 4%
Pre-Construction Design Costs	6.00%	$109,721	note: DEC uses 6%
Engineering During Construction	2.00%	$36,574	note: DEC uses 2%
General Contractor Profit	6.00%	$109,721	Note DEC adds 6%
Indirect Costs/Basic Disposal	25.00%	$457,173	
Subt: Fac Ponds		$2,285,864	
Plus Contingency	10.00%	$228,586	CWM and DEC 10%
Tot: Fac Ponds		$2,514,451	

Cost References:
"RSM/HC" refers to the RSMeans "Heavy Construction Cost Data", 2009 Edition (rates adjusted for inflation)
"RSM/UP" refers to the RSMeans "Environmental Remediation Cost Data - Unit Price", 2004 Edition (rates adjusted for inflation)
"RSM/BC" refers to the RSMeans "Building Construction Cost Data", 2003 Edition (rates adjusted for inflation)

8.01 CSA New Full Trail Parking 5 Tankers

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
8.01.1 Inventory Verification						prod'n rates: 8 tankers or rolloffs/hour/crew; two persons required;	
Laborer	1.25	hours	$39.00	$49	$49	5 tankers @ 0.125 hr/tanker = 0.625 hours @ 2 units/crew = 1.25 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Subtotal - Inventory Verification				**$49**	**$49**	area capacity is 24 tankers: 5 tanker proposed permit limit	However, unit only capable of storing 29 tankers
8.01.2 Inventory Verification						prod'n rates: 8 tankers or rolloffs/hour/crew; two persons required;	
Laborer	9.6	hours	$39.00	$374	$374	38 rolloffs @ 0.125 hr/rolloff = 4.8 hours @ 2 units/crew = 9.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Subtotal - Inventory Verification				$374	$374	area capacity is 48 rolloffs end to end	
(Subt: Assemblies 8.01.1 - 8.01.2)				**$423**	**$423**	*conducting inventory of CSA 11 (New Full Trailer Parking Area)*	
8.01.3 Offsite Transportation						Five (5) 5,500-gal tankers parked at CSA 11 = 27,500 gals	
Transport in 5,500-gal tanker	7645.0	miles	$3.50	$26,758	$26,758	27,500 gals @ 5500 gals/load = 5.0 loads @ 1529 miles/trip = 7645 miles	Rate: transporters quote/site experience
Offsite Transportation - Solids	14630.0	miles	$3.25	$47,548	$0	608 tons @ 16 tons/load = 38.0 loads @ 385 miles/trip = 14630 miles	Rate: transporters quote/site experience
Subt - Offsite Transportation				**$74,305**	**$26,758**	assumes offsite disposal/incineration of liquid	
8.01.4 Transp All Rolloffs: Onsite Stab						production rate = 10 mins/rolloff for on-site travel (all rolloffs previously existing at site)	
Road Tractor (4 x 2, 30-ton)	6.3	hours	$32.45	$0	$204	38 rolloffs @ 1 rolloff/load = 38.0 loads @ 10 mins/trip = 6.3 hours	RSM/HC p. 472 (line item 01 54 33 40 7410)
Driver	6.3	hours	$45.00	$0	$284	38 rolloffs @ 1 rolloff/load = 38.0 loads @ 10 mins/trip = 6.3 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Rolloff (30-CY) (existing equip't)	0.0	hours	$19.02	$0	$0	0 rolloffs @ 1 rolloff/load = 0.0 loads @ 0.5 hours/trip = 0.0 hours	dumpster RSM/BC p. 42 (02225-730-0800)
Subtotal -Transport Rolloffs Onsite				**$0**	**$488**	assumes onsite stabilization and disposal	
8.01.5 Stabilization (non-Macro mat'l)						prod'n rate = 100 tons/hour = 800 tons/day (non-Macro Room material); 30 CY roll = 16 tons	
PROCESS TONS (incl kiln dust)	699.0	*TONS*	*n/a*			38 rolloffs @ 30 CY each @ 16 tons/rolloff + 15% kiln dust = 699 tons	
Cement Kiln Dust - Mat'l&Delv Cost	91.0	tons	$48.00	$0	$4,368		CWM actual 2011 costs
Stabilization Cost	608.0	tons	$25.00	$0	$15,200		CWM actual 2011 costs inc. labor & equipment
TCLP Testing - RCRA (EPA 1311)	12.7	samp	$348.33	$0	$4,424	38 rolloffs @ 3 ro's/samp = 12.7 samples	average of 3 third party labs; one sample per 3 rolloffs
Subt - Stabilization				**$0**	**$23,992**		
8.01.6 Transp Rolloffs to Onsite L'fill						production rate = 0.25 hours for onsite travel	
Road Tractor (4 x 2, 30-ton)	9.5	hours	$32.45	$0	$308	38 rolloffs @ 1 rolloff/load = 38.0 loads @ 0.25 hours/trip = 9.5 hours	RSM/HC p. 472 (line item 01 54 33 40 7410)
Driver	9.5	hours	$45.00	$0	$428	38 rolloffs @ 1 rolloff/load = 38.0 loads @ 0.25 hours/trip = 9.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Rolloff (30-CY) (existing equip't)	0.0	hours	$19.02	$0	$0		dumpster RSM/BC p. 42 (02225-730-0800)
Subt - Transp RO's to Onsite Landfill				**$0**	**$736**	Assembly estimate assumes on-site disposal	
8.01.7 Unload non-Macro Rolloffs						production rate = 0.25 hours for unload in landfill	
Laborer	9.5	hours	$39.00	$0	$371	38 rolloffs @ 1 rolloff/load = 38.0 loads @ 0.25 hours/trip = 9.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Backhoe (1 CY)	9.5	hours	$19.18	$0	$182	38 rolloffs @ 1 rolloff/load = 38.0 loads @ 0.25 hours/trip = 9.5 hours	RSM/HC p. 467 (line item 01 54 33 20 0460)
Equipment Operator (Medium)	9.5	hours	$45.00	$0	$428	38 rolloffs @ 1 rolloff/load = 38.0 loads @ 0.25 hours/trip = 9.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Rolloff (30-CY) (existing equip't)	0.0	hours	$19.02	$0	$0		dumpster RSM/BC p. 42 (02225-730-0800)
Subt - Unload RO's at Onsite L'Fill				**$0**	**$980**		
8.01.8 Offsite Disposal							
Disposal Cost (Incin PCB Liquids)	27500.0	gallons	$4.68	$128,700	$128,700	27,500 gallons	HWC/ETC 2004 & Current third party rate
Offsite Disp - Haz Rolloff Solids	608.0	tons	$133.00	$80,864	$0	38 rolloffs @ 30 CY each @ 16 tons/rolloff = 608 tons	HWC/ETC 2004 & CWM 2011 cost comparison industry pricing based on current market conditions
Subt - Offsite Liquids Disposal				**$209,564**	**$128,700**		
(Subt: Assemblies 8.01.3 - 8.01.8)				**$283,869**	**$181,653**	*disposal of bulk liquid PCB wastes from 5 tankers/38 rolloffs*	

8.01 CSA New Full Trail Parking 5 Tankers

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
8.01.9 Decon CSA 11 Area (wash)						production rate = 105 SF/hr for 1-person crew w/ one unit each; facility experience	
Laborer	157.0	hours	$39.00	$6,123	$6,123	16504 SF @ 105 SF/hr = 157 hours @ 1 pers/crew = 157 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Pressure Washer	157.0	hours	$4.04	$634	$634	16504 SF @ 105 SF/hr = 157 hours @ 1 unit/crew = 157 hours	RSM/HC p. 471 (line item 01 54 33 40 5450)
Vacuum Sweeper	157.0	hours	$3.41	$535	$535	16504 SF @ 105 SF/hr = 157 hours @ 1 unit/crew = 157 hours	RSM/HC p. 473 (line item 01 54 33 40 7800)
Subt - Decon CSA 11 Area (wash)				**$7,293**	**$7,293**		
8.01.10 Decon CSA 11 Area (rinse)						production rate = 105 SF/hr for 1-person crew w/ one unit each; facility experience	
Laborer	157.0	hours	$39.00	$6,123	$6,123	16504 SF @ 105 SF/hr = 157 hours @ 1 pers/crew = 157 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Pressure Washer	157.0	hours	$4.04	$634	$634	16504 SF @ 105 SF/hr = 157 hours @ 1 unit/crew = 157 hours	RSM/HC p. 471 (line item 01 54 33 40 5450)
Vacuum Sweeper	157.0	hours	$3.41	$535	$535	16504 SF @ 105 SF/hr = 157 hours @ 1 unit/crew = 157 hours	RSM/HC p. 473 (line item 01 54 33 40 7800)
Subt - Decon CSA 11 Area (rinse)				**$7,293**	**$7,293**		
8.01.11 Decon water samp/disp - N/A						production rate = 0.5 hours/sample for two techs	
Technician	1.1	hours	$38.00	$42	$42	1.1 samp @ 0.5 hr/samp = 0.6 hours @ 2 pers/crew = 1.1 hours	technician rate: rate 2011 3rd party quote
VOC Analysis (EPA 624)	1.1	samp	$105.00	$116	$116	1.0 areas @ 1.1 samp/area = 1.1 samples	analytical price: average of three quotes
On-site Water Disposal	15000.0	gal	$0.0313	$470	$470	15,000 gallons	facility o/s mild waste treat price ; vol @ 0.05 gal/sf (equip lit)
Subt - Decon Water Samp/Dispose				**$627**	**$627**		
8.01.12 PCB Wipe Samples						production rate = 0.5 hours/sample for two techs	
Technician	26.4	hours	$38.00	$1,003	$1,003	26.4 samp @ 0.5 hr/samp = 13.2 hours @ 2 pers/crew = 26.4 hours	technician rate: rate 2011 3rd party quote
TCLP (Metals/VOCs/Semi-VOCs)	1.1	samp	$446.67	$491	$491	1.0 areas @ 1.1 samp/area = 1.1 samples	analytical price: average of three quotes
PCB Analysis (SW 8081/8082)	26.4	samp	$83.33	$2,200	$2,200	16504 SF @ 625 SF/samp = 26.4 samples	analytical price: average of three quotes
Subt - PCB Wipe/Destruct Samp				**$3,694**	**$3,694**		
(Subt: Assemblies 8.01.9 - 8.01.12)				**$18,907**	**$18,907**	decontamination & sampling of CSA 11 (New Full Parking Area)	
8.01.13 Demolish Conc CSA 11						prod'n rate = 8 CY/hr (site experience); 10" mesh reinf: 1 cf = 150#; 1 cy = 2 tons	
Laborer	52.9	hours	$39.00	$2,063	$2,063	13750 SF @ 260 SF/hour 52.9 hours @ 1 units/crew = 52.9 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	105.8	hours	$50.70	$5,364	$5,364	13750 SF @ 260 SF/hour 52.9 hours @ 2 units/crew = 105.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Excavator	105.8	hours	$84.09	$8,897	$8,897	13750 SF @ 260 SF/hour 52.9 hours @ 2 units/crew = 105.8 hours	RSM/HC p. 467 (line item 01 54 33 20 0320)
Hydraulic Hammer Attach (1,200#)	52.9	hours	$20.59	$1,089	$1,089	13750 SF @ 260 SF/hour 52.9 hours @ 1 units/crew = 52.9 hours	RSM/HC p. 467 (line item 01 54 33 20 0349)
Claw Attachment	52.9	hours	$2.47	$131	$131	13750 SF @ 260 SF/hour 52.9 hours @ 1 units/crew = 52.9 hours	RSM/HC p. 477 (line item 01 54 33 20 0345)
Loader	0.0	hours	$30.03	$0	$0	not required	RSM/HC p. 469 (line item 01 54 33 20 4730)
Dump Truck (12-ton load)	52.9	hours	$24.78	$1,311	$1,311	13750 SF @ 260 SF/hour 52.9 hours @ 1 units/crew = 52.9 hours	RSM/HC p. 469 (line item 01 54 33 20 5250)
Welding Equipment	52.9	hours	$5.41	$286	$286	13750 SF @ 260 SF/hour 52.9 hours @ 1 units/crew = 52.9 hours	RSM/HC p. 473 (line item 01 54 33 40 7800)
Subt - Demolish Conc CSA 11				**$19,141**	**$19,141**	509.2 CY @ 2 tons/CY = 1018.4 tons	Arcadis Drawing No. D-3A
8.01.14 Transp/Unload debris to onsite landfi						production rate = 0.5 hours for onsite travel	
Road Tractor (4 x 2, 30-ton)	0.0	hours	$32.45	$0	$0	not required	RSM/HC p. 472 (line item 01 54 33 40 7410)
Driver	42.4	hours	$45.00	$0	$1,908	1018.4 tons @ 12 tons/load = 84.9 loads 0.5 hours/trip = 42.4 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (12-ton load)	0.0	hours	$24.78	$0	$0	Included in 8.01.13 rate above	RSM/HC p. 469 (line item 01 54 33 20 5250)
Subt - Transp Debris to onsite L'fill				**$0**	**$1,908**	onsite disposal of debris	

8.01 CSA New Full Trail Parking 5 Tankers

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
8.01.15 Unload Demolition Debris						Included in 8.01.14	
Laborer	0.0	hours	$39.00	$0	$0	not required	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	0.0	hours	$50.70	$0	$0	not required	loaded labor rate: loaded labor rate 2011 3rd party quote
Loader	0.0	hours	$30.03	$0	$0	not required	RSM/HC p. 469 (line item 01 54 33 20 4730)
Dump Trailer (20 CY)	0.0	hours	$5.20	$0	$0	not required	RSM/HC p. 469 (line item 01 54 33 20 5400)
Subt - Unload Demo Debris				**$0**	**$0**		
8.01.16 Offsite Conc Debris T&D						assume off-site "D" disposal facility within 50 miles of facility; 1 CY = 32.5 SF of conc. @ 10" depth	
Offsite Transportation - Debris	161.5	miles	$3.25	$525	$0	509.2 CY @ 15 CY/load = 33.9 loads @ 5 miles/trip = 169.5 miles	Rate: transporters quote/site experience
Offsite Disposal - Concrete Debris	1018.4	tons	$35.00	$35,644	$0	509.2 CY @ 2 tons/CY = 1018.4 tons	Modern Disposal/Site Experience
Subt - Offsite Conc Debris T&D				**$36,169**	**$0**		
(Subt: Assemblies 8.01.13 - 8.01.16)				**$55,310**	**$21,049**	*off-site transport and disposal of demolition debris*	

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
8.01.17 Soils Samples						production rate = 0.5 hours/sample for two techs 13750/2500 = 6.0 grids	50' x 50' sample grids
Technician	6.6	hours	$38.00	$251	$251	6.6 samp @ 0.5 hr/samp = 3.3 hours @ 2 pers/crew = 6.6 hours	technician rate: rate 2011 3rd party quote
VOC/PCB/Total Metals Analysis	6.6	samp	$395.00	$2,607	$2,607	6.0 grid sq @ 1.1 samp/area = 6.6 samples	analytical price: average of three quotes
Subt - Soil Samples				**$2,858**	**$2,858**		
(Subt: Assemblies 8.01.17 - 8.01.17)				**$2,858**	**$2,858**	*soil sampling at CSA 11*	

Total Non-Super hours 593.6

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Offsite Disposal	2011 CWM Extended Price - Onsite Disposal	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
8.01.18 PPE Usage/H&S Planning						Level C @ 0%; Mod Level C @ 25%; Level D @ 75% for tot non-supv hrs for all tasks; HASP @ 2.5% of non-supv hrs	
PPE Usage - Level D	55.6	days	$0.00	$0	$0	593.6 hours @ 8 hr/day = 74.2 days @ 75% "D" days = 55.6 days	Standard Work Clothes - Site Experience
PPE Usage - Mod Level C	18.6	days	$9.00	$167	$167	593.6 hours @ 8 hr/day = 74.2 days @ 25% "Mod C" days = 18.6 days	25% of non-supv hrs in Mod Level C (price: $9/day)
PPE Usage - Level C	0.0	days	$25.00	$0	$0	593.6 hours @ 8 hr/day = 74.2 days @ 0% "C" days = 0 days	0% of non-supv hrs in Level C (price: $25/day)
Safety Engineer	14.8	hours	$75.00	$1,110	$1,110	593.6 hours @ 2.5% hr/hr = 14.8 hours	Safety Eng Rate: rate 2011 3rd party quote
Subt - PPE Usage/H&S Planning				**$1,277**	**$1,277**		
8.01.19 Supervision						2 weeks for closure of Full Trailer Parking closure	
Foreman	80.0	hours	$65.00	$5,200	$5,200	2 weeks @ 40 hrs/wk = 80.0 hours	Outside foreman rate: 2011 3rd party quote
Site Project Manager	0.0	hours	$75.00	$0	$0	Included in Gen'l Contractor G&A/Home Office indirect costs	Site Manager Rate: 2011 3rd party quote
Subtotal - Supervision				**$5,200**	**$5,200**		
8.01.20 Certification						Engineer @ 1.5% and Clerical @ 1.5% of total non-supervisory hours for all tasks	
Engineer	8.9	hours	$130.00	$1,157	$1,157	593.6 hours @ 0.015 hr/hr = 8.9 hours	Engineer rate: 2011 3rd party quote
Clerical	8.9	hours	$45.00	$401	$401	593.6 hours @ 0.015 hr/hr = 8.9 hours	Clerical rate: 2011 3rd party quote
Subtotal - Certification				**$1,558**	**$1,558**		
(Subt: Assemblies 8.01.18 - 8.01.20)				**$8,035**	**$8,035**		

8.01 CSA New Full Trail Parking 5 Tankers	**Direct Cost**	**Total**	**Basic**	**$369,401**	**$232,924**

8.01 CSA 11 (New Full Trail Parking)

Total Cost Summary

Cost Category	Proposed Percent of Direct Cost	Proposed 2011 Cost OffSite Disposal	Cost Range
Direct Costs/Basic Disposal		$369,401	
Plus Indirect Costs/Profit:			
Site Activity Management Costs	7.00%	$25,858	note: DEC uses 7%
Gen'l Contractor G&A/Home Office	4.00%	$14,776	note: DEC uses 4%
Pre-Construction Design Costs	6.00%	$22,164	note: DEC uses 6%
Engineering During Construction	2.00%	$7,388	note: DEC uses 2%
General Contractor Profit	6.00%	$22,164	Note DEC adds 6%
Indirect Costs/Basic Disposal	25.00%	$92,350	
Subt: CSA 11 (SouthTrail Pkg)		$461,751	
Plus Contingency	10.00%	$46,175	CWM and DEC 10%
Total: CSA (New Full Trail Pkg)		$507,926	

Cost References:

"RSM/HC" refers to the RSMeans "Heavy Construction Cost Data", 2009 Edition (rates adjusted for inflation)
"RSM/UP" refers to the RSMeans "Environmental Remediation Cost Data - Unit Price", 2004 Edition (rates adjusted for inflation)
"RSM/BC" refers to the RSMeans "Building Construction Cost Data", 2003 Edition (rates adjusted for inflation)

15.01 RMU-2 Landfill Closure (1-Cell)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References

Waste Cover Area Parameters		38.5 acres = 1,677,060 SF = 186,340 SY	= 62,113 BCY @ 1' deep	Includes slope correction	
1-Cell Scenario (Cell 20)	6.9	6.9 acres = 300,564 SF = 33,396 SY	= 11,132 BCY @ 1' deep	= 5,566 BCY @ 0.5' deep	= 16,698 BCY @ 1.5' deep
2-Cell Scenario (Cells 18,20)	13.1	13.1 acres = 570,636 SF = 63,404 SY	= 21,135 BCY @ 1' deep	= 10,567 BCY @ 0.5' deep	= 31,702 BCY @ 1.5' deep
3-Cell Scenario (Cells 18,20,19)	19.5	19.5 acres = 849,420 SF = 94,380 SY	= 31,460 BCY @ 1' deep	= 15,730 BCY @ 0.5' deep	= 47,190 BCY @ 1.5' deep
4-Cell Scenario (Cells 18,20,19,17)	25.4	25.4 acres = 1,106,424 SF = 122,936 SY	= 40,979 BCY @ 1' deep	= 20,489 BCY @ 0.5' deep	= 61,468 BCY @ 1.5' deep
5-Cell Scenario (Cells 18,20,19,17,16)	31.9	31.9 acres = 1,389,564 SF = 154,396 SY	= 51,465 BCY @ 1' deep	= 25,733 BCY @ 0.5' deep	= 77,198 BCY @ 1.5' deep
6-Cell Scenario (Cells 18,20,19,17,16,15)	38.5	38.5 acres = 1,677,060 SF = 186,340 SY	= 62,113 BCY @ 1' deep	= 31,056 BCY @ 0.5' deep	= 93,170 CY @ 1.5' deep

Liner Feet of Separtor Berm Converted to Perimeter Berm		Cut-Off-Wall Length		
1-Cell Scenario (Cell 20)	575	1-Cell Scenario (Cell 20)	445	BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material
2-Cell Scenario (Cells 18,20)	1490	2-Cell Scenario (Cells 18,20)	1300	
3-Cell Scenario (Cells 18,20,19)	1030	3-Cell Scenario (Cells 18,20,19)	960	
4-Cell Scenario (Cells 18,20,19,17)	575	4-Cell Scenario (Cells 18,20,19,17)	515	
5-Cell Scenario (Cells 18,20,19,17,16)	600	5-Cell Scenario (Cells 18,20,19,17,16)	500	
6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A	6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A	

Separator Berm, Perimeter Berm, and Cut-Off-Wall Lengths from RMU-2 Permit Drawing No. 5

Perimeter Ditch	2,290 linear feet	585+585+560+560 = 2,290
Drainage Tile System	2,939 linear feet	6.9 acres * 426 LF/acre = 2,939 LF

Material Pre-Qualification and Construction Testing Frequencies from RMU-2 Quality Assurance Manual and Technical Specifications (2013)

15.01.1 Convert Separator Berm to Perimeter Berm						
Perimeter Berm	575	lf	$ 2,338.17	$1,344,449	Includes 445 feet of Cut-0ff-Wall and 575 feet of perimeter berm construction	Value taken from 15.01 Closure Cost, 15.A Berm tab.
Subt - Convert Separator Berm to Perimeter Berm			$ 2,338.17	$1,344,449		
(Subt: Assemblies 15.01.1)				**$1,344,449**		

15.01.2 Final Waste Cover Grading					production rate = 250 cy/hr - based upon max of 12 inch depth	
Volume of Material to be Graded					11132 BCY plus 25% comp fact = 13914 LCY x 0% offsite mat'l = 0 LCY	no add'l mat'l; levelling/grading of existing waste pile only
Waste Grading	6.9	acre	$5,000.00	$34,500	6.9 acres	Contractor Rates/Site experience
Subt - Grading Final Waste Cover				**$34,500**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.01.3 Equipment Decontamination					production rate = 4 hours per unit with 2 man crew: 6 pieces of equipment	
Laborer	48	hours	$39.00	$1,872	6 units @ 4 hrs/unit = 24 hours @ 2 pers/crew = 48 hours	HASP req's two: loaded labor rate 2011 3rd party quote
Cleaning Solvent	6	gal	$4.00	$24	6 units @ 1 gal/unit = 6 gallons	site experience
Pressure Washer	24	hours	$4.04	$97	6 units @ 4 hrs/unit = 24 hours @ 1 units/crew = 24 hours	RSM/HC p. 471 (line item 01 54 33 40 5450)
PCB Solids/Debris Transport	4.8	mile	$3.50	$17	1 drum Solids/debris @ 80 drums/load = 0.0125 loads @ 385 miles/load = 4.8 miles	Rate: transporters quote/site experience
PCB Solids/Debris Disposal	1	drum	$100.00	$100	1 drum Solids/debris	HWC/ETC 2004 & CWM 2011 cost comparison industry pricing
Subt - Equipment Decontamination				**$2,110**		
15.01.4 Decon Water Samp/Dispose					production rate = 0.5 hours/sample for two techs	
Technician	1	hours	$38.00	$38	1.0 samp @ 0.5 hr/samp = 0.5 hours @ 2 pers/crew = 1.0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
VOC Analysis (EPA 624)	1	samp	$105.00	$105	1.0 areas @ 1.0 samp/area = 1.0 samples	analytical price: average of three quotes
On-site Water Disposal	1200	gal	$0.0313	$38	6 units @ 200 gal/unit/wa = 1200 gallons	200 gallons per unit/site experience
Subt - Decon Water Samp/Disposal				**$181**		

15.01 RMU-2 Landfill Closure (1-Cell)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.01.5 PCB Equipment Wipe					production rate = 0.5 hours/sample for two techs;2 wipe samples per unit/site experience	
Technician	12	hours	$38.00	$456	12.0 samp @ 0.5 hr/samp = 6.0 hours @ 2 pers/crew = 12.0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
PCB Analysis (SW 8081/8082)	12	samp	$83.33	$1,000	6 units @ 2 samp/unit = 12.0 samples	analytical price: average of three quotes
Subt - PCB Wipe				**$1,456**		
15.01.6 Perimeter Ditch Spreading					Included in 15.01.7	
Subt - Spreading Ditch Fill				**$0.00**		
15.01.7 Perimeter Road/Ditch Compaction					Includes ditch excavation & road placement compaction	
Subt - Compact Fin'l Cover/Ditch	2290	LF	$12.00	**$27,480**	Liner feet	2010 Average of two bids
15.01.8 Final Cover/Ditch Inspection					Included in CQA 15.01.28	
Subt - Inspecting Final Cover/Ditch				**$0**		
(Subt: Assemblies 15.01.2 thru 15.01.8)				**$65,726**	*grading, compacting, & inspecting final waste pile layer; decon & testing of equipment*	*waste cover area*

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.01.9 Grading Layer					Based on 2009 Design & 6.9 acres to be closed	Grading layer 0.5 feet thick
General Fill	6958	CY	$11.00	$76,538	5,566 BCY plus 25% comp fact = 6,958 LCY x 100% offsite mat'l 6,968 LCY	
General Fill Place/Compact	6958	CY	$10.00	$69,580	5,566 BCY plus 25% comp fact = 5,839 LCY x 100% offsite mat'l 6,968 LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Grading Layer Surface Prep	6.9	acre	$10,000.00	$69,000	6.9 acres	Site Experience
Subt - Grading Layer				**$215,118**		
15.01.10 Cover Geosynthetic Clay Liner					Based on 2009 Design & 6.9 acres to be closed	
GCL Material	375705	SF	$0.46	$172,824	300,564 SF plus 25% lap factor = 375,705 SF	2011 Actual Cost per SQFT including shipping & tax
GCL Installation	375705	SF	$0.35	$131,497	300,564 SF plus 25% lap factor = 375,705 SF	2010 Quoted price from CETCO
Subt - GCL				**$304,321**		
(Subt: Assemblies 15.01.9 thru 15.01.10)				**$519,439**	*spread and compact grading layer (0.5' offsite material) and install of impervious GCL*	*cap cover area*

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.01.11 40-Mil Liner					production rate = 250 SF/Hr,	
40-Mil Polymeric Liner	375705	SF	$0.21	$78,898	300,564 SF plus 25% lap factor = 375,705 SF	2010 Actual Cost per SQFT including tax & shipping
40-Mil Polymeric Liner Installation	375705	SF	$0.46	$172,824	300,564 SF plus 25% lap factor = 375,705 SF	2010 Quoted price from CETCO
Subt - 40-Mil Liner				**$251,722**		
15.01.12 Liner Anchor Trench						
Anchor Trench	6.9	acres	$1,000.00	$6,900	6.9 acres remaining	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Anchor Trench				**$6,900**	*includes labor & equipment for trenching, backfilling, and compacting (3' x 1.5')*	
15.01.13 Geocomposite Drainage Layer					production rate = 5,000 SF/Hr, RSM/UP p. 9-83 (33-08-0513)	
Geocomposite Drainage Layer	375705	SF	$0.38	$142,768	300,564 SF plus 25% lap factor = 375,705 SF	2011 Actual Blended cost (TN240 & TN350) including shipping & handling
Geocomposite Drainage Layer Install	375705	SF	$0.32	$120,226	300,564 SF plus 25% lap factor = 375,705 SF	2010 Quoted price from CETCO
Subt - Geocomposite Layer				**$262,994**		

15.01 RMU-2 Landfill Closure (1-Cell)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.01.14 Geosynthetic Liner Testing					QC testing included in Assem 15.01.11; see assembly 15.01.28 for QA Monitoring	
Subt - Liner Testing			$0	**$0**	field testing crew required to work concurrently with liner placement crew in Assem 15.01.11	
(Subt: Assemb 15.01.11 thru 15.01.14)				**$521,616**	*installing geosynthetics above impervious gcl layer*	*liner area: cap cover plus 25% lap factor*
15.01.15 Unclassified Fill					depth = 1.5 feet (in one 18" lift) for final cover	
General Fill - offsite source	20872	LCY	$11	$229,592	16,698 BCY plus 25% comp fact = 20,872 LCY x 100% offsite mat'l 20,872 LCY	Actual Quoted Cost 2011 (Tri-C, Inc.)
Subt - Spreading Unclassified Fill				**$229,592**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.01.16 Compacting Unclassified Fill					Compaction of one 1.5 feet lift	
Place/Spread/Compact Unclass. Fill	20872	LCY	$10	$208,720	16,698 BCY plus 25% comp fact = 20,872 LCY x 100% offsite mat'l 20,872 LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Compacting Unclass. Fill				**$208,720**		
15.01.17 Unclassified Fill Testing						
Subt - Unclassified Fill Testing				**$0**	Included in Assemb 15.01.28 QA/QC Monitoring	
15.01.18 Unclassified Fill Test Fill					Assume two sources of unclassified fill	
Test Fill Construction	1	each	$12,000	$12,000	1 test fill/source @ 1 source/6.9 acres = 1 test fills	Actual Cost 2011 (Tri-C, Inc.)
Test Fill QA Testing/Reporting	1	each	$8,000	$8,000		Actual Cost 2011 (Ensol, Inc.)
Subt - Unclassified Fill Test Fill				**$20,000**		
(Subt: Assemb 15.01.15 thru 15.01.18)				**$458,312**	*spreading and compacting unclassifed fill layer; 1.5-feet in depth using 100% offsite material*	*cap cover area*
15.01.19 Spreading Topsoil					depth = 0.5 feet	
Topsoil	6958	LCY	$15.00	$104,370	5,566 BCY plus 25% comp fact = 6,958 LCY x 100% offsite mat'l 6,958 LCY x	Actual Cost 2011 (Tri-C, Inc.)
Spreading Topsoil	6958	LCY	$11.00	$76,538	5,566 BCY plus 25% comp fact = 6,958 LCY x 100% offsite mat'l 6,958 LCY x	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Spreading Topsoil				**$180,908**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	Includes hydroseeding/mulch/fertilizer
15.01.20 Cap Vegetation						
Hydro Seeding w/Mulch & Fertilizer	0	MSF	0	$0	Included in Assemb 15.01.19	
Erosion Control Matting	1956	SY	$12.50	$24,450	1,760 LF x 10 ft wide rolls = 17,600 SF / 9 SF/SY = 1,956 SY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt -Cap Vegetation				**$24,450**		Drainage Tile System
(Subt: Assemb 15.01.19 thru 15.01.20)				**$205,358**	*placing topsoil and hydro seeding with mulch and fertilizer*	*cap cover area*
15.01.21 Downflume Installation						
Rip Rap Downflume (grouted)	1	each	$23,625.00	$23,625	6.9 acres @ 1 downflume = 1 downflume	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Install Downflume				**$23,625**		
15.01.22 Cap Drainage Syst Install'n						
Install Cap Drainage System	2939	LF	$15.06	$44,261	6.9 acres 2,939 LF	Actual Cost 2011 (Tri-C, Inc.)
Subt - Install Cap Drainage System				**$44,261**		Average of two bids (3rd bid disqualified due to non-conformity)
(Subt: Assemb 15.01.21 thru 15.01.22)				**$67,886**	downflume and drainage system installation	*cap cover area*

15.01 RMU-2 Landfill Closure (1-Cell)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.01.23 Groundwater Monitoring					production rate = 0.5 hours per sample for two techs; 9 wells; 1 events/6 months	
Monit'g Events & Samples/Event					0.0 quart'ly + 8 semi-ann + 1.0 b-ann'l x 1.05 each = 8.9 samp	includes 5% QA sampling
Technician	8.9	hours	$38.00	$338	8.9 samp @ 0.5 hrs/samp = 4.45 hours @ 2 units/crew = 8.9 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	8.9	samp	$25.00	$223	8.9 samples	bottles, shipping supplies
VOC Analysis (EPA 624)	8.9	samp	$105.00	$935		Average of three quotes
Subt - GW Mon During Closure				**$1,495**	*groundwater monitoring for six (6) months*	
(Subt: Assembly 15.01.23)				**$1,495**		

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.01.24 Leachate Management					leachate collected from surface and sub-surface projected to be mildly contaminated	
Onsite Aqueous Treatment	2962122	gals	$0.0178	$52,726	6.9 acres x 429,293 gal/acre = 2962122	17,000,000 gal = maximum volume of leachate for RMU-1 (39.6 acres) in past 10 years over 12 months closure. 17,000,000/39.6 = 429,293 gal/acre
Electricity for 40-gpm Pumps	0	kwh	$0.10	$0	2 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 0.0 pumps = 0.0 kwhs	40 gpm pump = 2 hp; 1.0 hph = .75 kwh
Electricity for 100-gpm Pumps	4380	kwh	$0.10	$438	5 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 1.0 pumps = 4,380 kwhs	100 gpm pump = 5 hp; 1.0 hph = .75 kwh
Electricity for 600-gpm Pump	26280	kwh	$0.10	$2,628	30 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 1.0 pump = 26,280 kwhs	600 gpm pump = 30 hp; 1.0 hph = .75 kwh
200 GPM Transfer Pump	1	each	$6,194.00	$6,194	1.0 pump =	2004 DEC Rate * Implicit Deflator
Fuel for 200-gpm Transfer Pump	1800	gals	$4.50	$8,100	2 gal/hr x 900 hrs/year x 1.0 pump = 1800 gals	fuel for transfer pump
Pump/Motor Replace/Maint/Repair	0.75	each	$2,294.00	$1,721	3 pumps x 25% factor = 0.75 events	2004 DEC Rate * Implicit Deflator
Subt - Leachate Management				**$71,806**	*leachate collection and management for twelve months*	
15.01.25 Leachate Monitoring					12 months of leachate monitoring	Sampling Frequency from Schedule I, Exhibit F, Condition G
Technician	12	hours	$38.00	$456	12 samp @ 0.5 hrs/samp = 6 hours @ 2 units/crew = 12 hours	
Sampling Supplies	12	samp	$5.00	$60	12 samples Included in unit rate	bottles, shipping supplies
Primary Leachate: PP VOCs (epa 624)	4.2	samp	$105.00	$441	4 samp/yr x 1 cell x 1.0 years 1.05 QA req't = 4.2 samples	analytical price: average of three quotes - permit specifications
Primary Leachate: PCBs (sw 8081)	2.1	samp	$131.67	$277	2 samp/yr x 1 cell x 1.0 years 1.05 QA req't = 2.1 samples	analytical price: average of three quotes - permit specifications
Primary Leachate: PP Metals (sw 6010)	2.1	samp	$155.00	$326	2 samp/yr x 1 cell x 1.0 years 1.05 QA req't = 2.1 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: VOCs (epa 624)	4.2	samp	$105.00	$441	4 samp/yr x 1 cell x 1.0 years 1.05 QA req't = 4.2 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: PP Organics	1.1	samp	$633.33	$697	1 samp/yr x 1 cell x 1.0 years 1.05 QA req't = 1.1 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: PP Metals (sw 6010)	1.1	samp	$155.00	$171	1 samp/yr x 1 cell x 1.0 years 1.05 QA req't = 1.1 samples	analytical price: average of three quotes - permit specifications
pH & conductivity	12.6	samp	$15.00	$189	12 samp/yr x 1 cell x 1.0 years 1.05 QA req't = 12.6 samples	analytical price: average of three quotes - permit specifications
Shipping	4.2	each	$5.00	$21		
Subt - Leachate Monitoring				**$3,077**	*leachate collection and management for twelve months*	CWM estimate for leachate monitoring for 6 months
(Subt: Assemb 15.01.24 thru 15.01.25)				**$74,883**		

15.01 RMU-2 Landfill Closure (1-Cell)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.01.26 PPE Usage & H&S Planning					Level C during waste grading, grading layer installation, and decon only.	
PPE Usage - Level D	345	days	$0.00	$0	50 man days/ acre x 6.9 acres = 345 days	50 man days/acre to complete closure
PPE Usage - Mod Level C	0	days	$9.00	$0	0 days for Modified Level C	
PPE Usage - Level C	69	days	$25.00	$1,725	5.0 days/acre x 6.9 acres x 2 crew = 69 days	5 days for waste grading per acre, grading layer installation and equip decon
Health & Safety Officer	82.8	hours	$75.00	$6,210	3312 hours @ 2.5% hr/hr = 82.8 hours	60 man days/acre * 8 hrs * 6.9 acres = 3036 hrs
Subt - PPE Usage/H&S Planning				**$7,935**		
15.01.27 Supervision						
Foreman	0	hours	$65.00	$0	Foreman included in per acre unit costs	
Site Project Manager	0	hours	$75.00	$0	Included in Construction Management costs	
Construction Management	6.9	acre	$4,500.00	$31,050	$4,500 per acre @ 6.9 acres	
Subtotal - Supervision				**$31,050**		
15.01.28 QA/QC Monitoring/Certification					300,564 SF plus 25% lap factor = 375,705 SF	
Final Cover						
GCL Conformance Testing	4.0	test	$235.00	$940	300,564 SF plus 25% lap factor = 375,705 SF @ 1 test/100000 SF = 4.0 tests	Actual Costs 2011 (TRI Environmental)
40-Mil Liner Conformance Testing	4.0	test	$98.00	$392	300,564 SF plus 25% lap factor = 375,705 SF @ 1 test/100000 SF = 4.0 tests	Actual Costs 2011 (TRI Environmental)
Geocomposite Liner Conformance Testing	4.0	test	$300.00	$1,200	300,564 SF plus 25% lap factor = 375,705 SF @ 1 test/100000 SF = 4.0 tests	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover GCL/Soil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover GCL/40-Mil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover 40-Mil/Geocomp)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover Geocomp/Soil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
QA/QC Monitoring/Certification	6.9	acre	$25,700.00	$177,330	6.9 acres	Actual cost 2010/2011 (Ensol, Inc.)
Subtotal - Certification				**$200,082**		
(Subt: Assemb 15.01.26 thru 15.01.28)				**$239,067**	*supervision, health & safety, and certification*	

15.01 RMU-2 Landfill Closure				**$3,498,232**	*CWM estimate based on 6.9 acres*

The Total Labor and Maintenance Costs per year to run the AWT Facility was calculated under the Site Wide Post Closure Plan (Assembly 13.0) and will remain constant regardless of whether or not RMU-2 is generating leachate; the labor, maintenance and number of days per year to run the facility will be the same. Therefore, no costs are associated with labor and maintenance.

15.01 RMU-2 Landfill Closure (1-Cell)

Cost Category	Proposed Percent of Direct Cost	Proposed 2011 Cost	Cost Range
Direct Costs/Basic Closure		$3,498,232	
Site Activity Management Costs	7.00%	$244,876	note: DEC uses 7%
Gen'l Contractor G&A/Home Office	4.00%	$139,929	note: DEC uses 4%
Pre-Construction Design Costs	6.00%	$209,894	note: DEC uses 6%
Engineering During Construction	2.00%	$69,965	note: DEC uses 2%
General Contractor Profit	6.00%	$209,894	Note DEC adds 6%
Indirect Costs/Basic Closure	25.00%	$874,558	
Subtotal - RMU-2 Landfill Closure		$4,372,790	
Plus Contingency	10.00%	$437,279	CWM and DEC 10%
Total - RMU-2 Landfill Closure		**$4,810,069**	

Cost Per Acre $697,111 *CWM estimate based on 6.9 acres*

Cost References:
"RSM/HC" refers to the RSMeans "Heavy Construction Cost Data", 2009 Edition (rates adjusted for inflation)
"RSM/UP" refers to the RSMeans "Environmental Remediation Cost Data - Unit Price", 2004 Edition (rates adjusted for inflation)
"RSM/BC" refers to the RSMeans "Building Construction Cost Data", 2003 Edition (rates adjusted for inflation)

Waste Area of RMU-2 (6 cells) : 38.5

Cell #	Acres	Cummulative Acres
20	6.9	6.9
18	6.2	13.1
19	6.4	19.5
17	5.9	25.4
16	6.5	31.9
15	6.6	38.5
Total Area	38.5	acres

Includes slope correction

Assumptions:

0.5 Grading Layer (Unclassified/General Fill)
Geosynthetic Clay Liner
40 mil roughened HDPE geomembrane
Geocomposite drainage layer
Eighteen inches (1.5 feet) of unclassified/general fill
Six inches (0.5 feet) topsoil and vegetative cover

Closure Scenarios - Assume Construction Sequence
Cell 20, 18, 19, 17, 16, 15

Closure Sequence
Cell 20
Cell 20/18
Cell 20/18/19
Cell 20/18/19/17
Cell 20/18/19/17/16
Cell 20/18/19/17/16/15

Convert Separation Berm to Perimeter Berm
1.1 Install Cut-off-Wall at outside toe-of-slope of the separator berm
1.2 Install perimeter berm
1.3 Install 3-foot compacted clay liner
1.4 Remove separator berm geosynthetics and clay
1.5 Install perimeter berm geosynthetics

15.02 RMU-2 Landfill Closure (2-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References

Waste Cover Area Parameters		38.5 acres = 1,677,060 SF = 186,340 SY	= 62,113 BCY @ 1' deep	Includes slope correction	
1-Cell Scenario (Cell 20)	6.9	6.9 acres = 300,564 SF = 33,396 SY	= 11,132 BCY @ 1' deep	= 5,566 BCY @ 0.5' deep	= 16,698 BCY @ 1.5' deep
2-Cell Scenario (Cells 18,20)	13.1	13.1 acres = 570,636 SF = 63,404 SY	= 21,135 BCY @ 1' deep	= 10,567 BCY @ 0.5' deep	= 31,702 BCY @ 1.5' deep
3-Cell Scenario (Cells 18,20,19)	19.5	19.5 acres = 849,420 SF = 94,380 SY	= 31,460 BCY @ 1' deep	= 15,730 BCY @ 0.5' deep	= 47,190 BCY @ 1.5' deep
4-Cell Scenario (Cells 18,20,19,17)	25.4	25.4 acres = 1,106,424 SF = 122,936 SY	= 40,979 BCY @ 1' deep	= 20,489 BCY @ 0.5' deep	= 61,468 BCY @ 1.5' deep
5-Cell Scenario (Cells 18,20,19,17,16)	31.9	31.9 acres = 1,389,564 SF = 154,396 SY	= 51,465 BCY @ 1' deep	= 25,733 BCY @ 0.5' deep	= 77,198 BCY @ 1.5' deep
6-Cell Scenario (Cells 18,20,19,17,16,15)	38.5	38.5 acres = 1,677,060 SF = 186,340 SY	= 62,113 BCY @ 1' deep	= 62,113 BCY @ 1' deep	= 93,170 CY @ 1.5' deep

Liner Feet of Separtor Berm Converted to Perimeter Berm		Cut-Off-Wall Length		
1-Cell Scenario (Cell 20)	575	1-Cell Scenario (Cell 20)	445	BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material
2-Cell Scenario (Cells 18,20)	1490	2-Cell Scenario (Cells 18,20)	1300	
3-Cell Scenario (Cells 18,20,19)	1030	3-Cell Scenario (Cells 18,20,19)	960	
4-Cell Scenario (Cells 18,20,19,17)	575	4-Cell Scenario (Cells 18,20,19,17)	515	
5-Cell Scenario (Cells 18,20,19,17,16)	600	5-Cell Scenario (Cells 18,20,19,17,16)	500	
6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A	6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A	

Separator Berm, Perimeter Berm, and Cut-Off-Wall Lengths from RMU-2 Permit Drawing No. 5

Perimeter Ditch	3,700 linear feet	1270+585+560+300+710+275=3,700
Drainage Tile System	5,580 linear feet	13.1 acres * 426 LF/acre = 5,580 LF

Material Pre-Qualification and Construction Testing Frequencies from RMU-2 Quality Assurance Manual and Technical Specifications (2013)

15.02.1 Convert Separator Berm to Perimeter Berm						
Perimeter Berm	1490	lf	$ 2,338.17	$3,483,877	Includes 1300 feet of Cut-0ff-Wall and 1490 feet of perimeter berm construction	Value taken from 15.01 Closure Cost, 15.A Berm tab.
Subt - Convert Separator Berm to Perimeter Berm			$ 2,338.17	$3,483,877		
(Subt: Assemblies 15.02.1)				$3,483,877		

15.02.2 Final Waste Cover Grading					production rate = 250 cy/hr - based upon max of 12 inch depth	
Volume of Material to be Graded					21,135 BCY plus 25% comp fact = 26,419 LCY x 0% offsite mat'l = 0 LCY	no add'l mat'l; levelling/grading of existing waste pile only
Waste Grading	13.1	acre	$5,000.00	$65,500	13.1 acres	Contractor Rates/Site experience
Subt - Grading Final Waste Cover				**$65,500**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.02.3 Equipment Decontamination					production rate = 4 hours per unit with 2 man crew: 6 pieces of equipment	
Laborer	48	hours	$39.00	$1,872	6 units @ 4 hrs/unit = 24 hours @ 2 pers/crew = 48 hours	HASP req's two: loaded labor rate 2011 3rd party quote
Cleaning Solvent	6	gal	$4.00	$24	6 units @ 1 gal/unit = 6 gallons	site experience
Pressure Washer	24	hours	$4.04	$97	6 units @ 4 hrs/unit = 24 hours @ 1 units/crew = 24 hours	RSM/HC p. 471 (line item 01 54 33 40 5450)
PCB Solids/Debris Transport	4.8	mile	$3.50	$17	1 drum Solids/debris @ 80 drums/load = 0.0125 loads @ 385 miles/load = 4.8 miles	Rate: transporters quote/site experience
PCB Solids/Debris Disposal	1	drum	$100.00	$100	1 drum Solids/debris	HWC/ETC 2004 & CWM 2011 cost comparison industry pricing
Subt - Equipment Decontamination				**$2,110**		
15.02.4 Decon Water Samp/Dispose					production rate = 0.5 hours/sample for two techs	
Technician	1	hours	$38.00	$38	1.0 samp @ 0.5 hr/samp = 0.5 hours @ 2 pers/crew = 1.0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
VOC Analysis (EPA 624)	1	samp	$105.00	$105	1.0 areas @ 1.0 samp/area = 1.0 samples	analytical price: average of three quotes
On-site Water Disposal	1200	gal	$0.0313	$38	6 units @ 200 gal/unit/wa = 1200 gallons	200 gallons per unit/site experience
Subt - Decon Water Samp/Disposal				**$181**		

15.02 RMU-2 Landfill Closure (2-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.02.5 PCB Equipment Wipe					production rate = 0.5 hours/sample for two techs;2 wipe samples per unit/site experience	
Technician	12	hours	$38.00	$456	12.0 samp @ 0.5 hr/samp = 6.0 hours @ 2 pers/crew = 12.0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
PCB Analysis (SW 8081/8082)	12	samp	$83.33	$1,000	6 units @ 2 samp/unit = 12.0 samples	analytical price: average of three quotes
Subt - PCB Wipe				**$1,456**		
15.02.6 Perimeter Ditch Spreading					Included in 15.02.7	
Subt - Spreading Ditch Fill				**$0.00**		
15.02.7 Perimeter Road/Ditch Compaction					Includes ditch excavation & road placement compaction	2010 Average of two bids
Subt - Compact Fin'l Cover/Ditch	3700	LF	$12.00	**$44,400**	Liner feet	
15.02.8 Final Cover/Ditch Inspection					Included in CQA 15.02.28	
Subt - Inspecting Final Cover/Ditch				**$0**		
(Subt: Assemblies 15.02.2 thru 15.02.8)				**$113,646**	*grading, compacting, & inspecting final waste pile layer; decon & testing of equipment*	*waste cover area*
15.02.9 Grading Layer					Based on 2009 Design & 13.1 acres to be closed: depth 0.5 ft	Grading layer 0.5 feet thick
General Fill	13209	CY	$11.00	$145,299	10,567 BCY plus 25% comp fact = 13,209 LCY x 100% offsite mat'l 13,209 LCY	
General Fill Place/Compact	13209	CY	$10.00	$132,090	10,567 BCY plus 25% comp fact = 13,209 LCY x 100% offsite mat'l 13,209 LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Grading Layer Surface Prep	13.1	acre	$10,000.00	$131,000	13.1 acres	Site Experience
Subt - Grading Layer				**$408,389**		
15.02.10 Cover Geosynthetic Clay Liner					Based on 2009 Design & 13.1 acres to be closed	
GCL Material	713295	SF	$0.46	$328,116	570,636 SF plus 25% lap factor = 713,395 SF	2011 Actual Cost per SQFT including shipping & tax
GCL Installation	713985	SF	$0.35	$249,895	570,636 SF plus 25% lap factor = 713,395 SF	2010 Quoted price from CETCO
Subt - GCL				**$578,010**		
(Subt: Assemblies 15.02.9 thru 15.02.10)				**$986,399**	*spread and compact grading layer (0.5' offsite material) and install of impervious GCL*	*cap cover area*
15.02.11 40-Mil Liner					production rate = 250 SF/Hr,	
40-Mil Polymeric Liner	713295	SF	$0.21	$149,792	570,636 SF plus 25% lap factor = 713,395 SF	2010 Actual Cost per SQFT including tax & shipping
40-Mil Polymeric Liner Installation	713295	SF	$0.46	$328,116	570,636 SF plus 25% lap factor = 713,395 SF	2010 Quoted price from CETCO
Subt - 40-Mil Liner				**$477,908**		
15.02.12 Liner Anchor Trench						
Anchor Trench	13.1	acres	$1,000.00	$13,100	13.1 acres remaining	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Anchor Trench				**$13,100**	*includes labor & equipment for trenching, backfilling, and compacting (3' x 1.5')*	
15.02.13 Geocomposite Drainage Layer					production rate = 5,000 SF/Hr, RSM/UP p. 9-83 (33-08-0513)	
Geocomposite Drainage Layer	713295	SF	$0.38	$271,052	570,636 SF plus 25% lap factor = 713,395 SF	2011 Actual Blended cost (TN240 & TN350) including shipping & handling
Geocomposite Drainage Layer Install	713295	SF	$0.32	$228,254		2010 Quoted price from CETCO
Subt - Geocomposite Layer				**$499,307**		

15.02 RMU-2 Landfill Closure (2-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.02.14 Geosynthetic Liner Testing					QC testing included in Assem 15.02.11; see assembly 15.02.28 for QA Monitoring	
Subt - Liner Testing			$0	**$0**	field testing crew required to work concurrently with liner placement crew in Assem 15.02.11	
(Subt: Assemb 15.02.11 thru 15.02.14)				**$990,314**	*installing geosynthetics above impervious gcl layer*	*liner area: cap cover plus 25% lap factor*
15.02.15 Unclassified Fill					depth = 1.5 feet (in one 18" lift) for final cover	
General Fill - offsite source	39628	LCY	$11	$435,908	31,702 BCY plus 25% comp fact = 39,628 LCY x 100% offsite mat'l 39,628 LCY	Actual Quoted Cost 2011 (Tri-C, Inc.)
Subt - Spreading Unclassified Fill				**$435,908**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.02.16 Compacting Unclassified Fill					Compaction of one 1.5 feet lift	
Place/Spread/Compact Unclass. Fill	39628	LCY	$10	$396,280	31,702 BCY plus 25% comp fact = 39,628 LCY x 100% offsite mat'l 39,628 LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Compacting Unclass. Fill				**$396,280**		
15.02.17 Unclassified Fill Testing						
Subt - Unclassified Fill Testing				**$0**	Included in Assemb 15.02.28 QA/QC Monitoring	
15.02.18 Unclassified Fill Test Fill					Assume two sources of unclassified fill	
Test Fill Construction	1	each	$12,000	$12,000	1 test fill/source @ 1 source/13.1 acres = 1 test fills	Actual Cost 2011 (Tri-C, Inc.)
Test Fill QA Testing/Reporting	1	each	$8,000	$8,000		Actual Cost 2011 (Ensol, Inc.)
Subt - Unclassified Fill Test Fill				**$20,000**		
(Subt: Assemb 15.02.15 thru 15.02.18)				**$852,188**	*spreading and compacting unclassifed fill layer; 1.5-feet in depth using 100% offsite material*	*cap cover area*
15.02.19 Spreading Topsoil					depth = 0.5 feet	
Topsoil	13209	LCY	$15.00	$198,135	10,567 BCY plus 25% comp fact = 13,209 LCY x 100% offsite mat'l 13,209 LCY	Actual Cost 2011 (Tri-C, Inc.)
Spreading Topsoil	13209	LCY	$11.00	$145,299	10,567 BCY plus 25% comp fact = 13,209 LCY x 100% offsite mat'l 13,209 LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Spreading Topsoil				**$343,434**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	Includes hydroseeding/mulch/fertilizer
15.02.20 Cap Vegetation						
Hydro Seeding w/Mulch & Fertilizer	0	MSF	0	$0	Included in Assemb 15.02.19	
Erosion Control Matting	3712	SY	$12.50	$46,400	3,340 LF x 10 FT wide rolls = 33,400 SF / 9 SF/SY = 3,712 SY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt -Cap Vegetation				**$46,400**		Drainage Tile System
(Subt: Assemb 15.02.19 thru 15.02.20)				**$389,834**	*placing topsoil and hydro seeding with mulch and fertilizer*	*cap cover area*
15.02.21 Downflume Installation						
Rip Rap Downflume (grouted)	2	each	$23,625.00	$47,250	13.1 acres @ 2 downflume = 2 downflume	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Install Downflume				**$47,250**		
15.02.22 Cap Drainage Syst Install'n					production rate = 47.5 LF/hr, RSM/SWL p. 77 (02510-850-0200)	
Install Cap Drainage System	5580	LF	$15.06	$84,035	11.21 acres 5,580 LF	Actual Cost 2011 (Tri-C, Inc.)
Subt - Install Cap Drainage System				**$84,035**		Average of two bids (3rd bid disqualified due to non-conformity)
(Subt: Assemb 15.02.21 thru 15.02.22)				**$131,285**	downflume and drainage system installation	*cap cover area*

15.02 RMU-2 Landfill Closure (2-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.02.23 Groundwater Monitoring					production rate = 0.5 hours per sample for two techs; 21 wells; 1 events/6 months	
Monit'g Events & Samples/Event					0.0 quart'ly + 20 semi-ann + 1.0 b-ann'l x 1.05 each = 21.5 samp	includes 5% QA sampling
Technician	21.5	hours	$38.00	$817	21.5 samp @ 0.5 hrs/samp = 10.7 hours @ 2 units/crew = 21.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	21.5	samp	$25.00	$538	21.5 samples	bottles, shipping supplies
VOC Analysis (EPA 624)	21.5	samp	$105.00	$2,258		Average of three quotes
Subt - GW Mon During Closure				**$3,612**	*groundwater monitoring for six (6) months*	
(Subt: Assembly 15.02.23)				**$3,612**		
15.02.24 Leachate Management					leachate collected from surface and sub-surface projected to be mildly contaminated	Sampling Frequency from Schedule I, Exhibit F, Condition G
Onsite Aqueous Treatment	5623738	gals	$0.0178	$100,103	13.1 acres x 429,293 gal/acre = 5,623,738	17,000,000 gal = maximum volume of leachate for RMU-1 (39.6 acres) in past 10 years over 12 months closure. 17,000,000/39.6 = 429,293 gal/acre
Electricity for 40-gpm Pumps	0	kwh	$0.10	$0	2 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 0.0 pumps = 0.0 kwhs	40 gpm pump = 2 hp; 1.0 hph = .75 kwh
Electricity for 100-gpm Pumps	8760	kwh	$0.10	$876	5 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 2.0 pumps = 8,760 kwhs	100 gpm pump = 5 hp; 1.0 hph = .75 kwh
Electricity for 600-gpm Pump	26280	kwh	$0.10	$2,628	30 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 1.0 pump = 26,280 kwhs	600 gpm pump = 30 hp; 1.0 hph = .75 kwh
200 GPM Transfer Pump	1	each	$6,194.00	$6,194	1.0 pump =	2004 DEC Rate * Implicit Deflator
Fuel for 200-gpm Transfer Pump	1800	gals	$4.50	$8,100	2 gal/hr x 900 hrs/year x 1.0 pump = 1800 gals	fuel for transfer pump
Pump/Motor Replace/Maint/Repair	1	each	$2,294.00	$2,294	4 pumps x 25% factor = 1.0 events	2004 DEC Rate * Implicit Deflator
Subt - Leachate Management				**$120,195**	*leachate collection and management for twelve months*	
15.02.25 Leachate Monitoring					12 months of leachate monitoring	
Technician	24	hours	$38.00	$912	24 samp @ 0.5 hrs/samp = 12 hours @ 2 units/crew = 24 hours	
Sampling Supplies	24	samp	$5.00	$120	24 samples Included in unit rate	bottles, shipping supplies
Primary Leachate: PP VOCs (epa 624)	8.4	samp	$105.00	$882	4 samp/yr x 2 cells x 1.0 years 1.05 QA req't = 8.4 samples	analytical price: average of three quotes - permit specifications
Primary Leachate: PCBs (sw 8081)	4.2	samp	$131.67	$553	2 samp/yr x 2 cells x 1.0 years 1.05 QA req't = 4.2 samples	analytical price: average of three quotes - permit specifications
Primary Leachate: PP Metals (sw 6010)	4.2	samp	$155.00	$651	2 samp/yr x 2 cells x 1.0 years 1.05 QA req't = 4.2 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: VOCs (epa 624)	8.4	samp	$105.00	$882	4 samp/yr x 2 cells x 1.0 years 1.05 QA req't = 8.4 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: PP Organics	2.1	samp	$633.33	$1,330	1 samp/yr x 2 cells x 1.0 years 1.05 QA req't = 2.1 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: PP Metals (sw 6010)	2.1	samp	$155.00	$326	1 samp/yr x 2 cells x 1.0 years 1.05 QA req't = 2.1 samples	analytical price: average of three quotes - permit specifications
pH & conductivity	25.2	samp	$15.00	$378	12 samp/yr x 2 cells x 1.0 years 1.05 QA req't = 25.2 samples	analytical price: average of three quotes - permit specifications
Shipping	8.4	each	$5.00	$42		
Subt - Leachate Monitoring				**$6,076**	*leachate collection and management for twelve months*	CWM estimate for leachate monitoring for 6 months
(Subt: Assemb 15.02.24 thru 15.02.25)				**$126,270**		
15.02.26 PPE Usage & H&S Planning					Level C during waste grading, grading layer installation, and decon only.	
PPE Usage - Level D	655	days	$0.00	$0	50 man days/ acre x 13.1 acres = 655 days	50 man days/acre to complete closure
PPE Usage - Mod Level C	0	days	$9.00	$0	0 days for Modified Level C	
PPE Usage - Level C	131	days	$25.00	$3,275	5 days/acre x 13.1 acres = 2 crew = 131 days	5 days for waste grading per acre, grading layer installation and equip decon
Health & Safety Officer	157.2	hours	$75.00	$11,790	6,288 hours @ 2.5% hr/hr = 157.2 hours	60 man days/acre * 8 hrs * 13.1 acres = 6288 hrs
Subt - PPE Usage/H&S Planning				**$15,065**		

15.02 RMU-2 Landfill Closure (2-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.02.27 Supervision						
Foreman	0	hours	$65.00	$0	Foreman included in per acre unit costs	
Site Project Manager	0	hours	$75.00	$0	Included in Construction Management costs	
Construction Management	13.1	acre	$4,500.00	$58,950	$4,500 per acre @ 13.1 acres	
Subtotal - Supervision				**$58,950**		
15.02.28 QA/QC Monitoring/Certification						
Final Cover					570,636 SF plus 25% lap factor = 713,395 SF	
GCL Conformance Testing	8.0	test	$235.00	$1,880	570,636 SF plus 25% lap factor = 713,395 SF @ 1 test/100000 SF = 8.0 tests	Actual Costs 2011 (TRI Environmental)
40-Mil Liner Conformance Testing	8.0	test	$98.00	$784	570,636 SF plus 25% lap factor = 713,395 SF @ 1 test/100000 SF = 8.0 tests	Actual Costs 2011 (TRI Environmental)
Geocomposite Liner Conformance Testing	8.0	test	$300.00	$2,400	570,636 SF plus 25% lap factor = 713,395 SF @ 1 test/100000 SF = 8.0 tests	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover GCL/Soil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover GCL/40-Mil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover 40-Mil/Geocomp)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover Geocomp/Soil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
QA/QC Monitoring/Certification	13.1	acre	$25,700.00	$336,670	13.1 acres	Actual cost 2010/2011 (Ensol, Inc.)
Subtotal - Certification				**$361,954**		
(Subt: Assemb 15.02.26 thru 15.02.28)				**$435,969**	*supervision, health & safety, and certification*	
15.02 RMU-2 Landfill Closure				**$7,513,394**	*CWM estimate based on 13.1 acres*	

The Total Labor and Maintenance Costs per year to run the AWT Facility was calculated under the Site Wide Post Closure Plan and will remain constant regardless of whether or not RMU-2 is generating leachate; the labor, maintenance and number of days per year to run the facility will be the same. Therefore, no costs are associated with labor and maintenance.

15.02 RMU-2 Landfill Closure (2-Cells)

Cost Category	Proposed Percent of Direct Cost	Proposed 2011 Cost	Cost Range
Direct Costs/Basic Closure		$7,513,394	
Site Activity Management Costs	7.00%	$525,938	note: DEC uses 7%
Gen'l Contractor G&A/Home Office	4.00%	$300,536	note: DEC uses 4%
Pre-Construction Design Costs	6.00%	$450,804	note: DEC uses 6%
Engineering During Construction	2.00%	$150,268	note: DEC uses 2%
General Contractor Profit	6.00%	$450,804	Note DEC adds 6%
Indirect Costs/Basic Closure	25.00%	$1,878,349	
Subtotal - RMU-2 Landfill Closure		$9,391,743	
Plus Contingency	10.00%	$939,174	CWM and DEC 10%
Total - RMU-2 Landfill Closure		**$10,330,917**	

Cost Per Acre $788,619.63 *CWM estimate based on 13.1 acres*

Cost References:
"RSM/HC" refers to the RSMeans "Heavy Construction Cost Data", 2009 Edition (rates adjusted for inflation)
"RSM/UP" refers to the RSMeans "Environmental Remediation Cost Data - Unit Price", 2004 Edition (rates adjusted for inflation)
"RSM/BC" refers to the RSMeans "Building Construction Cost Data", 2003 Edition (rates adjusted for inflation)

Waste Area of RMU-2 (6 cells) : 38.5

Cell #	Acres	Cummulative Acres
20	6.9	6.9
18	6.2	13.1
19	6.4	19.5
17	5.9	25.4
16	6.5	31.9
15	6.6	38.5
Total Area	38.5	acres

Includes slope correction

Assumptions:

0.5 Grading Layer (Unclassified/General Fill)
Geosynthetic Clay Liner
40 mil roughened HDPE geomembrane
Geocomposite drainage layer
Eighteen inches (1.5 feet) of unclassified/general fill
Six inches (0.5 feet) topsoil and vegetative cover

Closure Scenarios - Assume Construction Sequence
Cell 20, 18, 19, 17, 16, 15

Closure Sequence
Cell 20
Cell 20/18
Cell 20/18/19
Cell 20/18/19/17
Cell 20/18/19/17/16
Cell 20/18/19/17/16/15

Convert Separation Berm to Perimeter Berm
1.1 Install Cut-off-Wall at outside toe-of-slope of the separator berm
1.2 Install perimeter berm
1.3 Install 3-foot compacted clay liner
1.4 Remove separator berm geosynthetics and clay
1.5 Install perimeter berm geosynthetics

15.03 RMU-2 Landfill Closure (3-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References

Waste Cover Area Parameters		38.5 acres = 1,677,060 SF = 186,340 SY	= 62,113 BCY @ 1' deep	Includes slope correction	
1-Cell Scenario (Cell 20)	6.9	6.9 acres = 300,564 SF = 33,396 SY	= 11,132 BCY @ 1' deep	= 5,566 BCY @ 0.5' deep	= 16,698 BCY @ 1.5' deep
2-Cell Scenario (Cells 18,20)	13.1	13.1 acres = 570,636 SF = 63,404 SY	= 21,135 BCY @ 1' deep	= 10,567 BCY @ 0.5' deep	= 31,702 BCY @ 1.5' deep
3-Cell Scenario (Cells 18,20,19)	19.5	19.5 acres = 849,420 SF = 94,380 SY	= 31,460 BCY @ 1' deep	= 15,730 BCY @ 0.5' deep	= 47,190 BCY @ 1.5' deep
4-Cell Scenario (Cells 18,20,19,17)	25.4	25.4 acres = 1,106,424 SF = 122,936 SY	= 40,979 BCY @ 1' deep	= 20,489 BCY @ 0.5' deep	= 61,468 BCY @ 1.5' deep
5-Cell Scenario (Cells 18,20,19,17,16)	31.9	31.9 acres = 1,389,564 SF = 154,396 SY	= 51,465 BCY @ 1' deep	= 25,733 BCY @ 0.5' deep	= 77,198 BCY @ 1.5' deep
6-Cell Scenario (Cells 18,20,19,17,16,15)	38.5	38.5 acres = 1,677,060 SF = 186,340 SY	= 62,113 BCY @ 1' deep	= 31,056 BCY @ 0.5' deep	= 93,170 CY @ 1.5' deep

Liner Feet of Separtor Berm Converted to Perimeter Berm		Cut-Off-Wall Length		
1-Cell Scenario (Cell 20)	575	1-Cell Scenario (Cell 20)	445	BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material
2-Cell Scenario (Cells 18,20)	1490	2-Cell Scenario (Cells 18,20)	1300	
3-Cell Scenario (Cells 18,20,19)	1030	3-Cell Scenario (Cells 18,20,19)	960	
4-Cell Scenario (Cells 18,20,19,17)	575	4-Cell Scenario (Cells 18,20,19,17)	515	
5-Cell Scenario (Cells 18,20,19,17,16)	600	5-Cell Scenario (Cells 18,20,19,17,16)	500	
6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A	6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A	

Separator Berm, Perimeter Berm, and Cut-Off-Wall Lengths from RMU-2 Permit Drawing No. 5

Perimeter Ditch	4,700 linear feet	560+585+670+500+600+775+710+300 = 4,700
Drainage Tile System	8,307 linear feet	19.5 acres * 426 LF/acre = 8,307 LF

Material Pre-Qualification and Construction Testing Frequencies from RMU-2 Quality Assurance Manual and Technical Specifications (2013)

15.03.1 Convert Separator Berm to Perimeter Berm						
Perimeter Berm	1030	lf	$2,338.17	$2,408,317	Includes 960 feet of Cut-0ff-Wall and 1030 feet of perimeter berm construction	Value taken from 15.01 Closure Cost, 15.A Berm tab.
Subt - Convert Separator Berm to Perimeter Berm			$2,338.17	$2,408,317		
(Subt: Assemblies 15.02.1)				$2,408,317		

15.03.2 Final Waste Cover Grading					production rate = 250 cy/hr - based upon max of 12 inch depth	
Volume of Material to be Graded					31,460 BCY plus 25% comp fact = 39,325 LCY x 0% offsite mat'l = 0 LCY	no add'l mat'l; levelling/grading of existing waste pile only
Waste Grading	19.5	acre	$5,000.00	$97,500	19.5 acres	Contractor Rates/Site experience
Subt - Grading Final Waste Cover				**$97,500**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.03.3 Equipment Decontamination					production rate = 4 hours per unit with 2 man crew: 6 pieces of equipment	
Laborer	48	hours	$39.00	$1,872	6 units @ 4 hrs/unit = 24 hours @ 2 pers/crew = 48 hours	HASP req's two: loaded labor rate 2011 3rd party quote
Cleaning Solvent	6	gal	$4.00	$24	6 units @ 1 gal/unit = 6 gallons	site experience
Pressure Washer	24	hours	$4.04	$97	6 units @ 4 hrs/unit = 24 hours @ 1 units/crew = 24 hours	RSM/HC p. 471 (line item 01 54 33 40 5450)
PCB Solids/Debris Transport	4.8	mile	$3.50	$17	1 drum Solids/debris @ 80 drums/load = 0.0125 loads @ 385 miles/load = 4.8 miles	Rate: transporters quote/site experience
PCB Solids/Debris Disposal	1	drum	$100.00	$100	1 drum Solids/debris	HWC/ETC 2004 & CWM 2011 cost comparison industry pricing
Subt - Equipment Decontamination				**$2,110**		
15.03.4 Decon Water Samp/Dispose					production rate = 0.5 hours/sample for two techs	
Technician	1	hours	$38.00	$38	1.0 samp @ 0.5 hr/samp = 0.5 hours @ 2 pers/crew = 1.0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
VOC Analysis (EPA 624)	1	samp	$105.00	$105	1.0 areas @ 1.0 samp/area = 1.0 samples	analytical price: average of three quotes
On-site Water Disposal	1200	gal	$0.0313	$38	6 units @ 200 gal/unit/wa = 1200 gallons	200 gallons per unit/site experience
Subt - Decon Water Samp/Disposal				**$181**		

15.03 RMU-2 Landfill Closure (3-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.03.5 PCB Equipment Wipe					production rate = 0.5 hours/sample for two techs;2 wipe samples per unit/site experience	
Technician	12	hours	$38.00	$456	12.0 samp @ 0.5 hr/samp = 6.0 hours @ 2 pers/crew = 12.0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
PCB Analysis (SW 8081/8082)	12	samp	$83.33	$1,000	6 units @ 2 samp/unit = 12.0 samples	analytical price: average of three quotes
Subt - PCB Wipe				**$1,456**		
15.03.6 Perimeter Ditch Spreading					Included in 15.03.7	
Subt - Spreading Ditch Fill				**$0.00**		
15.03.7 Perimeter Road/Ditch Compaction					Includes ditch excavation & road placement compaction	2010 Average of two bids
Subt - Compact Fin'l Cover/Ditch	4700	LF	$12.00	**$56,400**	Liner feet	
15.03.8 Final Cover/Ditch Inspection					Included in CQA 15.03.28	
Subt - Inspecting Final Cover/Ditch				**$0**		
(Subt: Assemblies 15.03.2 thru 15.03.8)				**$157,646**	*grading, compacting, & inspecting final waste pile layer; decon & testing of equipment*	*waste cover area*

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.03.9 Grading Layer					Based on 2009 Design & 19.5 acres to be closed	Grading layer 0.5 feet thick
General Fill	19662	CY	$11.00	$216,282	15,730 BCY plus 25% comp fact = 19,662 LCY x 100% offsite mat'l 19,662 LCY	
General Fill Place/Compact	19662	CY	$10.00	$196,620	15,730 BCY plus 25% comp fact = 19,662 LCY x 100% offsite mat'l 19,662 LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Grading Layer Surface Prep	19.5	acre	$10,000.00	$195,000	19.5 acres	Site Experience
Subt - Grading Layer				**$607,902**		
15.03.10 Cover Geosynthetic Clay Liner					Based on 2009 Design & 19.5 acres to be closed	
GCL Material	1062775	SF	$0.46	$488,877	849,420 SF plus 25% lap factor = 1,062,775 SF	2011 Actual Cost per SQFT including shipping & tax
GCL Installation	1062775	SF	$0.35	$371,971	849,420 SF plus 25% lap factor = 1,062,775 SF	2010 Quoted price from CETCO
Subt - GCL				**$860,848**		
(Subt: Assemblies 15.03.9 thru 15.03.10)				**$1,468,750**	*spread and compact grading layer (0.5' offsite material) and install of impervious GCL*	*cap cover area*

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.03.11 40-Mil Liner					production rate = 250 SF/Hr,	
40-Mil Polymeric Liner	1062775	SF	$0.21	$223,183	849,420 SF plus 25% lap factor = 1,062,775 SF	2010 Actual Cost per SQFT including tax & shipping
40-Mil Polymeric Liner Installation	1062775	SF	$0.46	$488,877	849,420 SF plus 25% lap factor = 1,062,775 SF	2010 Quoted price from CETCO
Subt - 40-Mil Liner				**$712,059**		
15.03.12 Liner Anchor Trench						
Anchor Trench	19.5	acres	$1,000.00	$19,500	19.5 acres remaining	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Anchor Trench				**$19,500**	*includes labor & equipment for trenching, backfilling, and compacting (3' x 1.5')*	
15.03.13 Geocomposite Drainage Layer					production rate = 5,000 SF/Hr, RSM/UP p. 9-83 (33-08-0513)	
Geocomposite Drainage Layer	1062775	SF	$0.38	$403,855	849,420 SF plus 25% lap factor = 1,062,775 SF	2011 Actual Blended cost (TN240 & TN350) including shipping & handling
Geocomposite Drainage Layer Install	1062775	SF	$0.32	$340,088	849,420 SF plus 25% lap factor = 1,062,775 SF	2010 Quoted price from CETCO
Subt - Geocomposite Layer				**$743,943**		

15.03 RMU-2 Landfill Closure (3-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.03.14 Geosynthetic Liner Testing					QC testing included in Assem 15.03.11; see assembly 15.03.28 for QA Monitoring	
Subt - Liner Testing			$0	**$0**	field testing crew required to work concurrently with liner placement crew in Assem 15.03.11	
(Subt: Assemb 15.03.11 thru 15.03.14)				**$1,475,502**	*installing geosynthetics above impervious gcl layer*	*liner area: cap cover plus 25% lap factor*
15.03.15 Unclassified Fill					depth = 1.5 feet (in one 18" lift) for final cover	
General Fill - offsite source	58988	LCY	$11	$648,868	47,190 BCY plus 25% comp fact = 58,988 LCY x 100% offsite mat'l 58,988 LCY	Actual Quoted Cost 2011 (Tri-C, Inc.)
Subt - Spreading Unclassified Fill				**$648,868**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.03.16 Compacting Unclassified Fill					Compaction of one 1.5 feet lift	
Place/Spread/Compact Unclass. Fill	58988	LCY	$10	$589,880	47,190 BCY plus 25% comp fact = 58,988 LCY x 100% offsite mat'l 58,988 LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Compacting Unclass. Fill				**$589,880**		
15.03.17 Unclassified Fill Testing						
Subt - Unclassified Fill Testing				**$0**	Included in Assemb 15.03.28 QA/QC Monitoring	
15.03.18 Unclassified Fill Test Fill					Assume two sources of unclassified fill	
Test Fill Construction	2	each	$12,000	$24,000	1 test fill/source @ 2 source/16.56 acres = 2 test fills	Actual Cost 2011 (Tri-C, Inc.)
Test Fill QA Testing/Reporting	2	each	$8,000	$16,000		Actual Cost 2011 (Ensol, Inc.)
Subt - Unclassified Fill Test Fill				**$40,000**		
(Subt: Assemb 15.03.15 thru 15.03.18)				**$1,278,748**	*spreading and compacting unclassifed fill layer; 1.5-feet in depth using 100% offsite material*	*cap cover area*
15.03.19 Spreading Topsoil					depth = 0.5 feet	
Topsoil	19662	LCY	$15.00	$294,930	15,730 BCY plus 25% comp fact = 19,662 LCY x 100% offsite mat'l 19,662 LCY	Actual Cost 2011 (Tri-C, Inc.)
Spreading Topsoil	19662	LCY	$11.00	$216,282	15,730 BCY plus 25% comp fact = 19,662 LCY x 100% offsite mat'l 19,662 LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Spreading Topsoil				**$511,212**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	Includes hydroseeding/mulch/fertilizer
15.03.20 Cap Vegetation						
Hydro Seeding w/Mulch & Fertilizer	0	MSF	0	$0	Included in Assemb 15.03.19	
Erosion Control Matting	5,525	SY	$12.50	$69,063	4,972 LF x 10 ft wide rolls = 49,720 SF / 9 SF/SY = 5,525 SY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt -Cap Vegetation				**$69,063**		
(Subt: Assemb 15.03.19 thru 15.03.20)				**$580,275**	*placing topsoil and hydro seeding with mulch and fertilizer*	*cap cover area*
15.03.21 Downflume Installation						
Rip Rap Downflume (grouted)	2	each	$23,625.00	$47,250	19.5 acres @ 2 downflume = 2 downflume	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Install Downflume				**$47,250**		
15.03.22 Cap Drainage Syst Install'n					production rate = 47.5 LF/hr, RSM/SWL p. 77 (02510-850-0200)	
Install Cap Drainage System	8307	LF	$15.06	$125,103	19.5 acres 8,307 LF	Actual Cost 2011 (Tri-C, Inc.)
Subt - Install Cap Drainage System				**$125,103**		Average of two bids (3rd bid disqualified due to non-conformity)
(Subt: Assemb 15.03.21 thru 15.03.22)				**$172,353**	downflume and drainage system installation	*cap cover area*

15.03 RMU-2 Landfill Closure (3-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.03.23 Groundwater Monitoring					production rate = 0.5 hours per sample for two techs; 21 wells; 2 events/12 months	
Monit'g Events & Samples/Event					0.0 quart'ly + 40 semi-ann + 1.0 b-ann'l x 1.05 each = 42.5 samp	includes 5% QA sampling
Technician	42.5	hours	$38.00	$1,615	42.5 samp @ 0.5 hrs/samp = 11.1 hours @ 2 units/crew = 42.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	42.5	samp	$25.00	$1,063	42.5 samples	bottles, shipping supplies
VOC Analysis (EPA 624)	42.5	samp	$105.00	$4,463		Average of three quotes
Subt - GW Mon During Closure				**$7,140**	*groundwater monitoring for twelve (12) months*	
(Subt: Assembly 15.03.23)				**$7,140**		

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.03.24 Leachate Management					leachate collected from surface and sub-surface projected to be mildly contaminated	
Onsite Aqueous Treatment	8371314	gals	$0.0178	$149,009	19.5 acres x 429,293 gal/acre = 8,371,314	17,000,000 gal = maximum volume of leachate for RMU-1 (39.6 acres) in past 10 years over 12 months closure. 17,000,000/39.6 = 429,293 gal/acre
Electricity for 40-gpm Pumps	12264	kwh	$0.10	$1,226	2 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 0.0 pumps = 0.0 kwhs	40 gpm pump = 2 hp; 1.0 hph = .75 kwh
Electricity for 100-gpm Pumps	13140	kwh	$0.10	$1,314	5 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 3.0 pumps = 13,140 kwhs	100 gpm pump = 5 hp; 1.0 hph = .75 kwh
Electricity for 600-gpm Pump	26280	kwh	$0.10	$2,628	30 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 1.0 pump = 26,280 kwhs	600 gpm pump = 30 hp; 1.0 hph = .75 kwh
200 GPM Transfer Pump	1	each	$6,194.00	$6,194	1.0 pump =	2004 DEC Rate * Implicit Deflator
Fuel for 200-gpm Transfer Pump	1800	gals	$4.50	$8,100	2 gal/hr x 900 hrs/year x 1.0 pump = 1800 gals	fuel for transfer pump
Pump/Motor Replace/Maint/Repair	1.25	each	$2,294.00	$2,868	5 pumps x 25% factor = 1.25 events	2004 DEC Rate * Implicit Deflator
Subt - Leachate Management				**$171,339**	*leachate collection and management for twelve months*	
15.03.25 Leachate Monitoring					12 months of leachate monitoring	Sampling Frequency from Schedule I, Exhibit F, Condition G
Technician	36	hours	$38.00	$1,368	36 samp @ 0.5 hrs/samp = 18 hours @ 2 units/crew = 36 hours	
Sampling Supplies	36	samp	$5.00	$180	36 samples Included in unit rate	bottles, shipping supplies
Primary Leachate: PP VOCs (epa 624)	12.6	samp	$105.00	$1,323	4 samp/yr x 3 cells x 1.0 years 1.05 QA req't = 12.6 samples	analytical price: average of three quotes - permit specifications
Primary Leachate: PCBs (sw 8081)	6.3	samp	$131.67	$830	2 samp/yr x 3 cells x 1.0 years 1.05 QA req't = 6.3 samples	analytical price: average of three quotes - permit specifications
Primary Leachate: PP Metals (sw 6010)	6.3	samp	$155.00	$977	2 samp/yr x 3 cells x 1.0 years 1.05 QA req't = 6.3 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: VOCs (epa 624)	12.6	samp	$105.00	$1,323	4 samp/yr x 3 cells x 1.0 years 1.05 QA req't = 12.6 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: PP Organics	3.2	samp	$633.33	$2,027	1 samp/yr x 3 cells x 1.0 years 1.05 QA req't = 3.2 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: PP Metals (sw 6010)	3.2	samp	$155.00	$496	1 samp/yr x 3 cells x 1.0 years 1.05 QA req't = 3.2 samples	analytical price: average of three quotes - permit specifications
pH & conductivity	37.8	samp	$15.00	$567	12 samp/yr x 3 cells x 1.0 years 1.05 QA req't = 37.8 samples	analytical price: average of three quotes - permit specifications
Shipping	12.6	each	$5.00	$63		
Subt - Leachate Monitoring				**$9,153**	*leachate collection and management for twelve months*	CWM estimate for leachate monitoring for 6 months
(Subt: Assemb 15.03.24 thru 15.03.25)				**$180,492**		

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.03.26 PPE Usage & H&S Planning					Level C during waste grading, grading layer installation, and decon only.	
PPE Usage - Level D	975	days	$0.00	$0	50 man days/ acre x 19.5 acres = 975 days	50 man days/acre to complete closure
PPE Usage - Mod Level C	0	days	$9.00	$0	0 days for Modified Level C	
PPE Usage - Level C	195	days	$25.00	$4,875	5 days/acre x 19.5 acres x 2 crew = 195 days	5 days for waste grading per acre, grading layer installation and equip decon
Health & Safety Officer	234	hours	$75.00	$17,550	9,360 hours @ 2.5% hr/hr = 234 hours	60 man days/acre * 8 hrs * 19.5 acres = 9360 hrs
Subt - PPE Usage/H&S Planning				**$22,425**		

15.03 RMU-2 Landfill Closure (3-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.03.27 Supervision						
Foreman	0	hours	$65.00	$0	Foreman included in per acre unit costs	
Site Project Manager	0	hours	$75.00	$0	Included in Construction Management costs	
Construction Management	19.5	acre	$4,500.00	$87,750	$4,500 per acre @ 19.5 acres	
Subtotal - Supervision				**$87,750**		
15.03.28 QA/QC Monitoring/Certification					849,420 SF plus 25% lap factor = 1,062,775 SF	
Final Cover						
GCL Conformance Testing	11.0	test	$235.00	$2,585	849,420 SF plus 25% lap factor = 1,062,775 SF @ 1 test/100000 SF = 11 tests	Actual Costs 2011 (TRI Environmental)
40-Mil Liner Conformance Testing	11.0	test	$98.00	$1,078	849,420 SF plus 25% lap factor = 1,062,775 SF @ 1 test/100000 SF = 11 tests	Actual Costs 2011 (TRI Environmental)
Geocomposite Liner Conformance Testing	11.0	test	$300.00	$3,300	849,420 SF plus 25% lap factor = 1,062,775 SF @ 1 test/100000 SF = 11 tests	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover GCL/Soil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover GCL/40-Mil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover 40-Mil/Geocomp)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover Geocomp/Soil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
QA/QC Monitoring/Certification	19.5	acre	$25,700.00	$501,150	19.5 acres	Actual cost 2010/2011 (Ensol, Inc.)
Subtotal - Certification				**$528,333**		
(Subt: Assemb 15.03.26 thru 15.03.28)				**$638,508**	*supervision, health & safety, and certification*	

15.03 RMU-2 Landfill Closure				**$8,367,731**	*CWM estimate based on 19.5 acres*

The Total Labor and Maintenance Costs per year to run the AWT Facility was calculated under the Site Wide Post Closure Plan and will remain constant regardless of whether or not RMU-2 is generating leachate; the labor, maintenance and number of days per year to run the facility will be the same. Therefore, no costs are associated with labor and maintenance.

15.03 RMU-2 Landfill Closure (3-Cells)

Cost Category	Proposed Percent of Direct Cost	Proposed 2011 Cost	Cost Range
Direct Costs/Basic Closure		$8,367,731	
Site Activity Management Costs	7.00%	$585,741	note: DEC uses 7%
Gen'l Contractor G&A/Home Office	4.00%	$334,709	note: DEC uses 4%
Pre-Construction Design Costs	6.00%	$502,064	note: DEC uses 6%
Engineering During Construction	2.00%	$167,355	note: DEC uses 2%
General Contractor Profit	6.00%	$502,064	Note DEC adds 6%
Indirect Costs/Basic Closure	25.00%	$2,091,933	
Subtotal - RMU-2 Landfill Closure		$10,459,664	
Plus Contingency	10.00%	$1,045,966	CWM and DEC 10%
Total - RMU-2 Landfill Closure		**$11,505,630**	

Cost Per Acre $590,032.32 *CWM estimate based on 19.5 acres*

Cost References:
"RSM/HC" refers to the RSMeans "Heavy Construction Cost Data", 2009 Edition (rates adjusted for inflation)
"RSM/UP" refers to the RSMeans "Environmental Remediation Cost Data - Unit Price", 2004 Edition (rates adjusted for inflation)
"RSM/BC" refers to the RSMeans "Building Construction Cost Data", 2003 Edition (rates adjusted for inflation)

Waste Area of RMU-2 (6 cells) : 38.5

Cell #	Acres	Cummulative Acres
20	6.9	6.9
18	6.2	13.1
19	6.4	19.5
17	5.9	25.4
16	6.5	31.9
15	6.6	38.5
Total Area	38.5	acres

Includes slope correction

Assumptions:

0.5 Grading Layer (Unclassified/General Fill)
Geosynthetic Clay Liner
40 mil roughened HDPE geomembrane
Geocomposite drainage layer
Eighteen inches (1.5 feet) of unclassified/general fill
Six inches (0.5 feet) topsoil and vegetative cover

Closure Scenarios - Assume Construction Sequence
Cell 20, 18, 19, 17, 16, 15

Closure Sequence
Cell 20
Cell 20/18
Cell 20/18/19
Cell 20/18/19/17
Cell 20/18/19/17/16
Cell 20/18/19/17/16/15

Convert Separation Berm to Perimeter Berm
1.1 Install Cut-off-Wall at outside toe-of-slope of the separator berm
1.2 Install perimeter berm
1.3 Install 3-foot compacted clay liner
1.4 Remove separator berm geosynthetics and clay
1.5 Install perimeter berm geosynthetics

15.04 RMU-2 Landfill Closure (4-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References

Waste Cover Area Parameters		38.5 acres = 1,677,060 SF = 186,340 SY	= 62,113 BCY @ 1' deep	Includes slope correction	
1-Cell Scenario (Cell 20)	6.9	6.9 acres = 300,564 SF = 33,396 SY	= 11,132 BCY @ 1' deep	= 5,566 BCY @ 0.5' deep	= 16,698 BCY @ 1.5' deep
2-Cell Scenario (Cells 18,20)	13.1	13.1 acres = 570,636 SF = 63,404 SY	= 21,135 BCY @ 1' deep	= 10,567 BCY @ 0.5' deep	= 31,702 BCY @ 1.5' deep
3-Cell Scenario (Cells 18,20,19)	19.5	19.5 acres = 849,420 SF = 94,380 SY	= 31,460 BCY @ 1' deep	= 15,730 BCY @ 0.5' deep	= 47,190 BCY @ 1.5' deep
4-Cell Scenario (Cells 18,20,19,17)	25.4	25.4 acres = 1,106,424 SF = 122,936 SY	= 40,979 BCY @ 1' deep	= 20,489 BCY @ 0.5' deep	= 61,468 BCY @ 1.5' deep
5-Cell Scenario (Cells 18,20,19,17,16)	31.9	31.9 acres = 1,389,564 SF = 154,396 SY	= 51,465 BCY @ 1' deep	= 25,733 BCY @ 0.5' deep	= 77,198 BCY @ 1.5' deep
6-Cell Scenario (Cells 18,20,19,17,16,15)	38.5	38.5 acres = 1,677,060 SF = 186,340 SY	= 62,113 BCY @ 1' deep	= 31,056 BCY @ 0.5' deep	= 93,170 CY @ 1.5' deep

Liner Feet of Separtor Berm Converted to Perimeter Berm		Cut-Off-Wall Length		
1-Cell Scenario (Cell 20)	575	1-Cell Scenario (Cell 20)	445	BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material
2-Cell Scenario (Cells 18,20)	1490	2-Cell Scenario (Cells 18,20)	1300	
3-Cell Scenario (Cells 18,20,19)	1030	3-Cell Scenario (Cells 18,20,19)	960	
4-Cell Scenario (Cells 18,20,19,17)	575	4-Cell Scenario (Cells 18,20,19,17)	515	
5-Cell Scenario (Cells 18,20,19,17,16)	600	5-Cell Scenario (Cells 18,20,19,17,16)	500	
6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A	6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A	

Separator Berm, Perimeter Berm, and Cut-Off-Wall Lengths from RMU-2 Permit Drawing No. 5

Perimeter Ditch	4,825 linear feet	1270+1200+600+500+670+585 = 4,825
Drainage Tile System	10,820 linear feet	25.4 acres * 426 LF/acre = 10,820 LF

Material Pre-Qualification and Construction Testing Frequencies from RMU-2 Quality Assurance Manual and Technical Specifications (2013)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.04.1 Convert Separator Berm to Perimeter Berm						
Perimeter Berm	575	lf	$2,338.17	$1,344,449	Includes 515 feet of Cut-0ff-Wall and 575 feet of perimeter berm construction	Value taken from 15.01 Closure Cost, 15.A Berm tab.
Subt - Convert Separator Berm to Perimeter Berm			$2,338.17	$1,344,449		
(Subt: Assemblies 15.02.1)				$1,344,449		

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.04.2 Final Waste Cover Grading					production rate = 250 cy/hr - based upon max of 12 inch depth	
Volume of Material to be Graded					40,979 BCY plus 25% comp fact = 51,224 LCY x 0% offsite mat'l = 0 LCY	no add'l mat'l; levelling/grading of existing waste pile only
Waste Grading	25.4	acre	$5,000.00	$127,000	25.4 acres	Contractor Rates/Site experience
Subt - Grading Final Waste Cover				**$127,000**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.04.3 Equipment Decontamination					production rate = 4 hours per unit with 2 man crew: 6 pieces of equipment	
Laborer	48	hours	$39.00	$1,872	6 units @ 4 hrs/unit = 24 hours @ 2 pers/crew = 48 hours	HASP req's two: loaded labor rate 2011 3rd party quote
Cleaning Solvent	6	gal	$4.00	$24	6 units @ 1 gal/unit = 6 gallons	site experience
Pressure Washer	24	hours	$4.04	$97	6 units @ 4 hrs/unit = 24 hours @ 1 units/crew = 24 hours	RSM/HC p. 471 (line item 01 54 33 40 5450)
PCB Solids/Debris Transport	4.8	mile	$3.50	$17	1 drum Solids/debris @ 80 drums/load = 0.0125 loads @ 385 miles/load = 4.8 miles	Rate: transporters quote/site experience
PCB Solids/Debris Disposal	1	drum	$100.00	$100	1 drum Solids/debris	HWC/ETC 2004 & CWM 2011 cost comparison industry pricing
Subt - Equipment Decontamination				**$2,110**		
15.04.4 Decon Water Samp/Dispose					production rate = 0.5 hours/sample for two techs	
Technician	1	hours	$38.00	$38	1.0 samp @ 0.5 hr/samp = 0.5 hours @ 2 pers/crew = 1.0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
VOC Analysis (EPA 624)	1	samp	$105.00	$105	1.0 areas @ 1.0 samp/area = 1.0 samples	analytical price: average of three quotes
On-site Water Disposal	1200	gal	$0.0313	$38	6 units @ 200 gal/unit/wa = 1200 gallons	200 gallons per unit/site experience
Subt - Decon Water Samp/Disposal				**$181**		

15.04 RMU-2 Landfill Closure (4-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.04.5 PCB Equipment Wipe					production rate = 0.5 hours/sample for two techs;2 wipe samples per unit/site experience	
Technician	12	hours	$38.00	$456	12.0 samp @ 0.5 hr/samp = 6.0 hours @ 2 pers/crew = 12.0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
PCB Analysis (SW 8081/8082)	12	samp	$83.33	$1,000	6 units @ 2 samp/unit = 12.0 samples	analytical price: average of three quotes
Subt - PCB Wipe				**$1,456**		
15.04.6 Perimeter Ditch Spreading					Included in 15.04.7	
Subt - Spreading Ditch Fill				**$0.00**		
15.04.7 Perimeter Road/Ditch Compaction					Includes ditch excavation & road placement compaction	2010 Average of two bids
Subt - Compact Fin'l Cover/Ditch	4825	LF	$12.00	**$57,900**	Liner feet	
15.04.8 Final Cover/Ditch Inspection					Included in CQA 15.04.28	
Subt - Inspecting Final Cover/Ditch				**$0**		
(Subt: Assemblies 15.04.2 thru 15.04.8)				**$188,646**	*grading, compacting, & inspecting final waste pile layer; decon & testing of equipment*	*waste cover area*

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.04.9 Grading Layer					Based on 2009 Design & 25.4 acres to be closed	Grading layer 0.5 feet thick
General Fill	25611	CY	$11.00	$281,721	20,489 BCY plus 25% comp fact = 25,611 LCY x 100% offsite mat'l = 25,611 LCY	
General Fill Place/Compact	25611	CY	$10.00	$256,110	20,489 BCY plus 25% comp fact = 25,611 LCY x 100% offsite mat'l = 25,611 LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Grading Layer Surface Prep	25.4	acre	$10,000.00	$254,000	25.4 acres	Site Experience
Subt - Grading Layer				**$791,831**		
15.04.10 Cover Geosynthetic Clay Liner					Based on 2009 Design & 25.4 acres to be closed	
GCL Material	1383030	SF	$0.46	$636,194	1,106,424 SF plus 25% lap factor = 1,383,030 SF	2011 Actual Cost per SQFT including shipping & tax
GCL Installation	1383030	SF	$0.35	$484,061	1,106,424 SF plus 25% lap factor = 1,383,030 SF	2010 Quoted price from CETCO
Subt - GCL				**$1,120,254**		
(Subt: Assemblies 15.04.9 thru 15.04.10)				**$1,912,085**	*spread and compact grading layer (0.5' offsite material) and install of impervious GCL*	*cap cover area*

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.04.11 40-Mil Liner					production rate = 250 SF/Hr,	
40-Mil Polymeric Liner	1383030	SF	$0.21	$290,436	1,106,424 SF plus 25% lap factor = 1,383,030 SF	2010 Actual Cost per SQFT including tax & shipping
40-Mil Polymeric Liner Installation	1383030	SF	$0.46	$636,194	1,106,424 SF plus 25% lap factor = 1,383,030 SF	2010 Quoted price from CETCO
Subt - 40-Mil Liner				**$926,630**		
15.04.12 Liner Anchor Trench						
Anchor Trench	25.4	acres	$1,000.00	$25,400	25.4 acres remaining	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Anchor Trench				**$25,400**	*includes labor & equipment for trenching, backfilling, and compacting (3' x 1.5')*	
15.04.13 Geocomposite Drainage Layer					production rate = 5,000 SF/Hr, RSM/UP p. 9-83 (33-08-0513)	
Geocomposite Drainage Layer	1383030	SF	$0.38	$525,551	1,106,424 SF plus 25% lap factor = 1,383,030 SF	2011 Actual Blended cost (TN240 & TN350) including shipping & handling
Geocomposite Drainage Layer Install	1383030	SF	$0.32	$442,570	1,106,424 SF plus 25% lap factor = 1,383,030 SF	2010 Quoted price from CETCO
Subt - Geocomposite Layer				**$968,121**		
15.04.14 Geosynthetic Liner Testing					QC testing included in Assem 15.04.11; see assembly 15.04.28 for QA Monitoring	
Subt - Liner Testing			$0	**$0**	field testing crew required to work concurrently with liner placement crew in Assem 15.04.11	
(Subt: Assemb 15.04.11 thru 15.04.14)				**$1,920,151**	*installing geosynthetics above impervious gcl layer*	*liner area: cap cover plus 25% lap factor*

15.04 RMU-2 Landfill Closure (4-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.04.15 Unclassified Fill					depth = 1.5 feet (in one 18" lift) for final cover	
General Fill - offsite source	76835	LCY	$11	$845,185	61,468 BCY plus 25% comp fact = 76,835 LCY x 100% offsite mat'l 76,835 LCY	Actual Quoted Cost 2011 (Tri-C, Inc.)
Subt - Spreading Unclassified Fill				**$845,185**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.04.16 Compacting Unclassified Fill					Compaction of one 1.5 feet lift	
Place/Spread/Compact Unclass. Fill	76835	LCY	$10	$768,350	61,468 BCY plus 25% comp fact = 76,835 LCY x 100% offsite mat'l 76,835 LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Compacting Unclass. Fill				**$768,350**		
15.04.17 Unclassified Fill Testing						
Subt - Unclassified Fill Testing				**$0**	Included in Assemb 15.04.28 QA/QC Monitoring	
15.04.18 Unclassified Fill Test Fill					Assume two sources of unclassified fill	
Test Fill Construction	2	each	$12,000	$24,000	1 test fill/source @ 2 source/21.98 acres = 2 test fills	Actual Cost 2011 (Tri-C, Inc.)
Test Fill QA Testing/Reporting	2	each	$8,000	$16,000		Actual Cost 2011 (Ensol, Inc.)
Subt - Unclassified Fill Test Fill				**$40,000**		
(Subt: Assemb 15.04.15 thru 15.04.18)				**$1,653,535**	*spreading and compacting unclassifed fill layer; 1.5-feet in depth using 100% offsite material*	*cap cover area*
15.04.19 Spreading Topsoil					depth = 0.5 feet	
Topsoil	25611	LCY	$15.00	$384,165	20,489 BCY plus 25% comp fact = 25,611 LCY x 100% offsite mat'l 25,611 LCY	Actual Cost 2011 (Tri-C, Inc.)
Spreading Topsoil	25611	LCY	$11.00	$281,721	20,489 BCY plus 25% comp fact = 25,611 LCY x 100% offsite mat'l 25,611 LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Spreading Topsoil				**$665,886**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	Includes hydroseeding/mulch/fertilizer
15.04.20 Cap Vegetation						
Hydro Seeding w/Mulch & Fertilizer	0	MSF	0	$0	Included in Assemb 15.04.19	
Erosion Control Matting	7197	SY	$12.50	$89,963	6477 LF x 10 ft wide rolls = 64,770 SF / 9 SF/SY = 7,197 SY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt -Cap Vegetation				**$89,963**		
(Subt: Assemb 15.04.19 thru 15.04.20)				**$755,849**	*placing topsoil and hydro seeding with mulch and fertilizer*	*cap cover area*
15.04.21 Downflume Installation						
Rip Rap Downflume (grouted)	2	each	$23,625.00	$47,250	25.4 acres @ 2 downflume = 2 downflume	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Install Downflume				**$47,250**		
15.04.22 Cap Drainage Syst Install'n					production rate = 47.5 LF/hr, RSM/SWL p. 77 (02510-850-0200)	
Install Cap Drainage System	10820	LF	$15.06	$162,949	25.4 acres 10,820 LF	Actual Cost 2011 (Tri-C, Inc.)
Subt - Install Cap Drainage System				**$162,949**		Average of two bids (3rd bid disqualified due to non-conformity)
(Subt: Assemb 15.04.21 thru 15.04.22)				**$210,199**	downflume and drainage system installation	*cap cover area*

15.04 RMU-2 Landfill Closure (4-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.04.23 Groundwater Monitoring					production rate = 0.5 hours per sample for two techs; 21 wells; 2 events/12 months	
Monit'g Events & Samples/Event					0.0 quart'ly + 40 semi-ann + 1.0 b-ann'l x 1.05 each = 42.5 samp	includes 5% QA sampling
Technician	42.5	hours	$38.00	$1,615	42.5 samp @ 0.5 hrs/samp = 11.1 hours @ 2 units/crew = 42.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	42.5	samp	$25.00	$1,063	42.5 samples	bottles, shipping supplies
VOC Analysis (EPA 624)	42.5	samp	$105.00	$4,463		Average of three quotes
Subt - GW Mon During Closure				**$7,140**	*groundwater monitoring for twelve (12) months*	
(Subt: Assembly 15.04.23)				**$7,140**		

15.04.24 Leachate Management					leachate collected from surface and sub-surface projected to be mildly contaminated	
Onsite Aqueous Treatment	10904042	gals	$0.0178	$194,092	25.4 acres x 429,293 gal/acre = 10,904,042	17,000,000 gal = maximum volume of leachate for RMU-1 (39.6 acres) in past 10 years over 12 months closure. 17,000,000/39.6 = 429,293 gal/acre
Electricity for 40-gpm Pumps	12264	kwh	$0.10	$1,226	2 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 0.0 pumps = 0.0 kwhs	40 gpm pump = 2 hp; 1.0 hph = .75 kwh
Electricity for 100-gpm Pumps	13140	kwh	$0.10	$1,314	5 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 4.0 pumps = 17,520 kwhs	100 gpm pump = 5 hp; 1.0 hph = .75 kwh
Electricity for 600-gpm Pump	26280	kwh	$0.10	$2,628	30 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 1.0 pump = 26,280 kwhs	600 gpm pump = 30 hp; 1.0 hph = .75 kwh
200 GPM Transfer Pump	1	each	$6,194.00	$6,194	1.0 pump =	2004 DEC Rate * Implicit Deflator
Fuel for 200-gpm Transfer Pump	1800	gals	$4.50	$8,100	2 gal/hr x 900 hrs/year x 1.0 pump = 1800 gals	fuel for transfer pump
Pump/Motor Replace/Maint/Repair	1.5	each	$2,294.00	$3,441	6 pumps x 25% factor = 1.5 events	2004 DEC Rate * Implicit Deflator
Subt - Leachate Management				**$216,995**	*leachate collection and management for twelve months*	
15.04.25 Leachate Monitoring					12 months of leachate monitoring	Sampling Frequency from Schedule I, Exhibit F, Condition G
Technician	48	hours	$38.00	$1,824	48 samp @ 0.5 hrs/samp = 24 hours @ 2 units/crew = 48 hours	
Sampling Supplies	48	samp	$5.00	$240	48 samples Included in unit rate	bottles, shipping supplies
Primary Leachate: PP VOCs (epa 624)	16.8	samp	$105.00	$1,764	4 samp/yr x 4 cells x 1.0 years 1.05 QA req't = 16.8 samples	analytical price: average of three quotes - permit specifications
Primary Leachate: PCBs (sw 8081)	8.4	samp	$131.67	$1,106	2 samp/yr x 4 cells x 1.0 years 1.05 QA req't = 8.4 samples	analytical price: average of three quotes - permit specifications
Primary Leachate: PP Metals (sw 6010)	8.4	samp	$155.00	$1,302	2 samp/yr x 4 cells x 1.0 years 1.05 QA req't = 8.4 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: VOCs (epa 624)	16.8	samp	$105.00	$1,764	4 samp/yr x 4 cells x 1.0 years 1.05 QA req't = 16.8 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: PP Organics	4.2	samp	$633.33	$2,660	1 samp/yr x 4 cells x 1.0 years 1.05 QA req't = 4.2 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: PP Metals (sw 6010)	4.2	samp	$155.00	$651	1 samp/yr x 4 cells x 1.0 years 1.05 QA req't = 4.2 samples	analytical price: average of three quotes - permit specifications
pH & conductivity	50.4	samp	$15.00	$756	12 samp/yr x 4 cells x 1.0 years 1.05 QA req't = 50.4 samples	analytical price: average of three quotes - permit specifications
Shipping	16.8	each	$5.00	$84		
Subt - Leachate Monitoring				**$12,151**	*leachate collection and management for twelve months*	CWM estimate for leachate monitoring for 6 months
(Subt: Assemb 15.04.24 thru 15.04.25)				**$229,146**		

15.04.26 PPE Usage & H&S Planning					Level C during waste grading, grading layer installation, and decon only.	
PPE Usage - Level D	1270	days	$0.00	$0	50 man days/ acre x 25.4 acres = 1270 days	50 man days/acre to complete closure
PPE Usage - Mod Level C	0	days	$9.00	$0	0 days for Modified Level C	
PPE Usage - Level C	254	days	$25.00	$6,350	5.0 days/acre x 25.4 acres x 2 crew = 254 days	5 days for waste grading per acre, grading layer installation and equip decon
Health & Safety Officer	304.8	hours	$75.00	$22,860	12,192 hours @ 2.5% hr/hr = 304.8 hours	60 man days/acre * 8 hrs * 25.4 acres = 12192 hrs
Subt - PPE Usage/H&S Planning				**$29,210**		

15.04 RMU-2 Landfill Closure (4-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.04.27 Supervision						
Foreman	0	hours	$65.00	$0	Foreman included in per acre unit costs	
Site Project Manager	0	hours	$75.00	$0	Included in Construction Management costs	
Construction Management	25.4	acre	$4,500.00	$114,300	$4,500 per acre @ 25.4 acres	
Subtotal - Supervision				**$114,300**		
15.04.28 QA/QC Monitoring/Certification						
Final Cover					1,106,424 SF plus 25% lap factor = 1,383,030 SF	
GCL Conformance Testing	14.0	test	$235.00	$3,290	1,106,424 SF plus 25% lap factor = 1,383,030 SF @ 1 test/100000 SF = 14 tests	Actual Costs 2011 (TRI Environmental)
40-Mil Liner Conformance Testing	14.0	test	$98.00	$1,372	1,106,424 SF plus 25% lap factor = 1,383,030 SF @ 1 test/100000 SF = 14 tests	Actual Costs 2011 (TRI Environmental)
Geocomposite Liner Conformance Testing	14.0	test	$300.00	$4,200	1,106,424 SF plus 25% lap factor = 1,383,030 SF @ 1 test/100000 SF = 14 tests	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover GCL/Soil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover GCL/40-Mil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover 40-Mil/Geocomp)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover Geocomp/Soil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
QA/QC Monitoring/Certification	25.4	acre	$25,700.00	$652,780	25.4 acres	Actual cost 2010/2011 (Ensol, Inc.)
Subtotal - Certification				**$681,862**		
(Subt: Assemb 15.04.26 thru 15.04.28)				**$825,372**	*supervision, health & safety, and certification*	

15.04 RMU-2 Landfill Closure				**$9,046,573**	*CWM estimate based on 25.4 acres*

The Total Labor and Maintenance Costs per year to run the AWT Facility was calculated under the Site Wide Post Closure Plan and will remain constant regardless of whether or not RMU-2 is generating leachate; the labor, maintenance and number of days per year to run the facility will be the same. Therefore, no costs are associated with labor and maintenance.

15.04 RMU-2 Landfill Closure (4-Cells)

Cost Category	Proposed Percent of Direct Cost	Proposed 2011 Cost	Cost Range
Direct Costs/Basic Closure		$9,046,573	
Site Activity Management Costs	7.00%	$633,260	note: DEC uses 7%
Gen'l Contractor G&A/Home Office	4.00%	$361,863	note: DEC uses 4%
Pre-Construction Design Costs	6.00%	$542,794	note: DEC uses 6%
Engineering During Construction	2.00%	$180,931	note: DEC uses 2%
General Contractor Profit	6.00%	$542,794	Note DEC adds 6%
Indirect Costs/Basic Closure	25.00%	$2,261,643	
Subtotal - RMU-2 Landfill Closure		$11,308,216	
Plus Contingency	10.00%	$1,130,822	CWM and DEC 10%
Total - RMU-2 Landfill Closure		**$12,439,038**	

Cost Per Acre $489,725.89 *CWM estimate based on 25.4 acres*

Cost References:
"RSM/HC" refers to the RSMeans "Heavy Construction Cost Data", 2009 Edition (rates adjusted for inflation)
"RSM/UP" refers to the RSMeans "Environmental Remediation Cost Data - Unit Price", 2004 Edition (rates adjusted for inflation)
"RSM/BC" refers to the RSMeans "Building Construction Cost Data", 2003 Edition (rates adjusted for inflation)

Waste Area of RMU-2 (6 cells) : 38.5

Cell #	Acres	Cummulative Acres
20	6.9	6.9
18	6.2	13.1
19	6.4	19.5
17	5.9	25.4
16	6.5	31.9
15	6.6	38.5
Total Area	38.5	acres

Includes slope correction

Assumptions:

0.5 Grading Layer (Unclassified/General Fill)
Geosynthetic Clay Liner
40 mil roughened HDPE geomembrane
Geocomposite drainage layer
Eighteen inches (1.5 feet) of unclassified/general fill
Six inches (0.5 feet) topsoil and vegetative cover

Closure Scenarios - Assume Construction Sequence
Cell 20, 18, 19, 17, 16, 15

Closure Sequence
Cell 20
Cell 20/18
Cell 20/18/19
Cell 20/18/19/17
Cell 20/18/19/17/16
Cell 20/18/19/17/16/15

Convert Separation Berm to Perimeter Berm
1.1 Install Cut-off-Wall at outside toe-of-slope of the separator berm
1.2 Install perimeter berm
1.3 Install 3-foot compacted clay liner
1.4 Remove separator berm geosynthetics and clay
1.5 Install perimeter berm geosynthetics

15.05 RMU-2 Landfill Closure (5-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References

Waste Cover Area Parameters		38.5 acres = 1,677,060 SF = 186,340 SY	= 62,113 BCY @ 1' deep	Includes slope correction	
1-Cell Scenario (Cell 20)	6.9	6.9 acres = 300,564 SF = 33,396 SY	= 11,132 BCY @ 1' deep	= 5,566 BCY @ 0.5' deep	= 16,698 BCY @ 1.5' deep
2-Cell Scenario (Cells 18,20)	13.1	13.1 acres = 570,636 SF = 63,404 SY	= 21,135 BCY @ 1' deep	= 10,567 BCY @ 0.5' deep	= 31,702 BCY @ 1.5' deep
3-Cell Scenario (Cells 18,20,19)	19.5	19.5 acres = 849,420 SF = 94,380 SY	= 31,460 BCY @ 1' deep	= 15,730 BCY @ 0.5' deep	= 47,190 BCY @ 1.5' deep
4-Cell Scenario (Cells 18,20,19,17)	25.4	25.4 acres = 1,106,424 SF = 122,936 SY	= 40,979 BCY @ 1' deep	= 20,489 BCY @ 0.5' deep	= 61,468 BCY @ 1.5' deep
5-Cell Scenario (Cells 18,20,19,17,16)	31.9	31.9 acres = 1,389,564 SF = 154,396 SY	= 51,465 BCY @ 1' deep	= 25,733 BCY @ 0.5' deep	= 77,198 BCY @ 1.5' deep
6-Cell Scenario (Cells 18,20,19,17,16,15)	38.5	38.5 acres = 1,677,060 SF = 186,340 SY	= 62,113 BCY @ 1' deep	= 31,056 BCY @ 0.5' deep	= 93,170 CY @ 1.5' deep

Liner Feet of Separtor Berm Converted to Perimeter Berm		Cut-Off-Wall Length		
1-Cell Scenario (Cell 20)	575	1-Cell Scenario (Cell 20)	445	BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material
2-Cell Scenario (Cells 18,20)	1490	2-Cell Scenario (Cells 18,20)	1300	
3-Cell Scenario (Cells 18,20,19)	1030	3-Cell Scenario (Cells 18,20,19)	960	
4-Cell Scenario (Cells 18,20,19,17)	575	4-Cell Scenario (Cells 18,20,19,17)	515	
5-Cell Scenario (Cells 18,20,19,17,16)	600	5-Cell Scenario (Cells 18,20,19,17,16)	500	
6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A	6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A	

Separator Berm, Perimeter Berm, and Cut-Off-Wall Lengths from RMU-2 Permit Drawing No. 5

Perimeter Ditch	6,035 linear feet	1200+600+500+670+585+560+560+500+600+260 = 6,035
Drainage Tile System	13,590 linear feet	31.9 acres * 426 LF/acre = 13,590 LF

Material Pre-Qualification and Construction Testing Frequencies from RMU-2 Quality Assurance Manual and Technical Specifications (2013)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.05.1 Convert Separator Berm to Perimeter Berm						
Perimeter Berm	600	lf	$ 2,338.17	$1,402,903	Includes 500 feet of Cut-Off-Wall and 600 feet of perimeter berm construction	Value taken from 15.01 Closure Cost, 15.A Berm tab.
Subt - Convert Separator Berm to Perimeter Berm			$ 2,338.17	$1,402,903		
(Subt: Assemblies 15.02.1)				**$1,402,903**		

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.05.2 Final Waste Cover Grading					production rate = 250 cy/hr - based upon max of 12 inch depth	
Volume of Material to be Graded					51,465 BCY plus 25% comp fact = 64,433 LCY x 0% offsite mat'l = 0 LCY	no add'l mat'l; levelling/grading of existing waste pile only
Waste Grading	31.7	acre	$5,000.00	$158,500	31.9 acres	Contractor Rates/Site experience
Subt - Grading Final Waste Cover				**$158,500**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.05.3 Equipment Decontamination					production rate = 4 hours per unit with 2 man crew: 6 pieces of equipment	
Laborer	48	hours	$39.00	$1,872	6 units @ 4 hrs/unit = 24 hours @ 2 pers/crew = 48 hours	HASP req's two: loaded labor rate 2011 3rd party quote
Cleaning Solvent	6	gal	$4.00	$24	6 units @ 1 gal/unit = 6 gallons	site experience
Pressure Washer	24	hours	$4.04	$97	6 units @ 4 hrs/unit = 24 hours @ 1 units/crew = 24 hours	RSM/HC p. 471 (line item 01 54 33 40 5450)
PCB Solids/Debris Transport	4.8	mile	$3.50	$17	1 drum Solids/debris @ 80 drums/load = 0.0125 loads @ 385 miles/load = 4.8 miles	Rate: transporters quote/site experience
PCB Solids/Debris Disposal	1	drum	$100.00	$100	1 drum Solids/debris	HWC/ETC 2004 & CWM 2011 cost comparison industry pricing
Subt - Equipment Decontamination				**$2,110**		
15.05.4 Decon Water Samp/Dispose					production rate = 0.5 hours/sample for two techs	
Technician	1	hours	$38.00	$38	1.0 samp @ 0.5 hr/samp = 0.5 hours @ 2 pers/crew = 1.0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
VOC Analysis (EPA 624)	1	samp	$105.00	$105	1.0 areas @ 1.0 samp/area = 1.0 samples	analytical price: average of three quotes
On-site Water Disposal	1200	gal	$0.0313	$38	6 units @ 200 gal/unit/wa = 1200 gallons	200 gallons per unit/site experience
Subt - Decon Water Samp/Disposal				**$181**		

15.05 RMU-2 Landfill Closure (5-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.05.5 PCB Equipment Wipe					production rate = 0.5 hours/sample for two techs;2 wipe samples per unit/site experience	
Technician	12	hours	$38.00	$456	12.0 samp @ 0.5 hr/samp = 6.0 hours @ 2 pers/crew = 12.0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
PCB Analysis (SW 8081/8082)	12	samp	$83.33	$1,000	6 units @ 2 samp/unit = 12.0 samples	analytical price: average of three quotes
Subt - PCB Wipe				**$1,456**		
15.05.6 Perimeter Ditch Spreading					Included in 15.05.7	
Subt - Spreading Ditch Fill				**$0.00**		
15.05.7 Perimeter Road/Ditch Compaction					Includes ditch excavation & road placement compaction	2010 Average of two bids
Subt - Compact Fin'l Cover/Ditch	6035	LF	$12.00	**$72,420**	Liner feet	
15.05.8 Final Cover/Ditch Inspection					Included in CQA 15.05.28	
Subt - Inspecting Final Cover/Ditch				**$0**		
(Subt: Assemblies 15.05.2 thru 15.05.8)				**$234,666**	*grading, compacting, & inspecting final waste pile layer; decon & testing of equipment*	*waste cover area*
15.05.9 Grading Layer					Based on 2009 Design & 31.9 acres to be closed	Grading layer 0.5 feet thick
General Fill	32166	CY	$11.00	$353,826	25,733 BCY plus 25% comp fact = 32,166 LCY x 100% offsite mat'l 32,166 LCY	
General Fill Place/Compact	32166	CY	$10.00	$321,660	25,733 BCY plus 25% comp fact = 32,166 LCY x 100% offsite mat'l 32,166 LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Grading Layer Surface Prep	31.9	acre	$10,000.00	$319,000	31.9 acres	Site Experience
Subt - Grading Layer				**$994,486**		
15.05.10 Cover Geosynthetic Clay Liner					Based on 2009 Design & 31.9 acres to be closed	
GCL Material	1736955	SF	$0.46	$798,999	1,389,564 SF plus 25% lap factor = 1,736,955 SF	2011 Actual Cost per SQFT including shipping & tax
GCL Installation	1736955	SF	$0.35	$607,934	1,389,564 SF plus 25% lap factor = 1,736,955 SF	2010 Quoted price from CETCO
Subt - GCL				**$1,406,934**		
(Subt: Assemblies 15.05.9 thru 15.05.10)				**$2,401,420**	*spread and compact grading layer (0.5' offsite material) and install of impervious GCL*	*cap cover area*
15.05.11 40-Mil Liner					production rate = 250 SF/Hr,	
40-Mil Polymeric Liner	1736955	SF	$0.21	$364,761	1,389,564 SF plus 25% lap factor = 1,736,955 SF	2010 Actual Cost per SQFT including tax & shipping
40-Mil Polymeric Liner Installation	1736955	SF	$0.46	$798,999	1,389,564 SF plus 25% lap factor = 1,736,955 SF	2010 Quoted price from CETCO
Subt - 40-Mil Liner				**$1,163,760**		
15.05.12 Liner Anchor Trench						
Anchor Trench	31.9	acres	$1,000.00	$31,900	31.9 acres remaining	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Anchor Trench				**$31,900**	*includes labor & equipment for trenching, backfilling, and compacting (3' x 1.5')*	
15.05.13 Geocomposite Drainage Layer					production rate = 5,000 SF/Hr, RSM/UP p. 9-83 (33-08-0513)	
Geocomposite Drainage Layer	1736955	SF	$0.38	$660,043	1,389,564 SF plus 25% lap factor = 1,736,955 SF	2011 Actual Blended cost (TN240 & TN350) including shipping & handling
Geocomposite Drainage Layer Install	1736955	SF	$0.32	$555,826	1,389,564 SF plus 25% lap factor = 1,736,955 SF	2010 Quoted price from CETCO
Subt - Geocomposite Layer				**$1,215,869**		
15.05.14 Geosynthetic Liner Testing					QC testing included in Assem 15.05.11; see assembly 15.05.28 for QA Monitoring	
Subt - Liner Testing			$0	**$0**	field testing crew required to work concurrently with liner placement crew in Assem 15.05.11	
(Subt: Assemb 15.05.11 thru 15.05.14)				**$2,411,528**	*installing geosynthetics above impervious gcl layer*	*liner area: cap cover plus 25% lap factor*

15.05 RMU-2 Landfill Closure (5-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.05.15 Unclassified Fill					depth = 1.5 feet (in one 18" lift) for final cover	
General Fill - offsite source	96498	LCY	$11	$1,061,478	77,198 BCY plus 25% comp fact = 87,877 LCY x 100% offsite mat'l 96,498LCY	Actual Quoted Cost 2011 (Tri-C, Inc.)
Subt - Spreading Unclassified Fill				**$1,061,478**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.05.16 Compacting Unclassified Fill					Compaction of one 1.5 feet lift	
Place/Spread/Compact Unclass. Fill	96498	LCY	$10	$964,980	77,198 BCY plus 25% comp fact = 87,877 LCY x 100% offsite mat'l 96,498LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Compacting Unclass. Fill				**$964,980**		
15.05.17 Unclassified Fill Testing						
Subt - Unclassified Fill Testing				**$0**	Included in Assemb 15.05.28 QA/QC Monitoring	
15.05.18 Unclassified Fill Test Fill					Assume two sources of unclassified fill	
Test Fill Construction	2	each	$12,000	$24,000	1 test fill/source @ 2 source/31.9 acres = 2 test fills	Actual Cost 2011 (Tri-C, Inc.)
Test Fill QA Testing/Reporting	2	each	$8,000	$16,000		Actual Cost 2011 (Ensol, Inc.)
Subt - Unclassified Fill Test Fill				**$40,000**		
(Subt: Assemb 15.05.15 thru 15.05.18)				**$2,066,458**	*spreading and compacting unclassifed fill layer; 1.5-feet in depth using 100% offsite material*	*cap cover area*
15.05.19 Spreading Topsoil					depth = 0.5 feet	
Topsoil	32166	LCY	$15.00	$482,490	25,733 BCY plus 25% comp fact = 32,166 LCY x 100% offsite mat'l 32,166 LCY	Actual Cost 2011 (Tri-C, Inc.)
Spreading Topsoil	32166	LCY	$11.00	$353,826	25,733 BCY plus 25% comp fact = 32,166 LCY x 100% offsite mat'l 32,166 LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Spreading Topsoil				**$836,316**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	Includes hydroseeding/mulch/fertilizer
15.05.20 Cap Vegetation						
Hydro Seeding w/Mulch & Fertilizer	0	MSF	0	$0	Included in Assemb 15.05.19	
Erosion Control Matting	8587	SY	$12.50	$107,338	7,728 LF x 10 ft wide rolls = 77,280 SF / 9 SF/SY = 8,587 SY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt -Cap Vegetation				**$107,338**		
(Subt: Assemb 15.05.19 thru 15.05.20)				**$943,654**	*placing topsoil and hydro seeding with mulch and fertilizer*	*cap cover area*
15.05.21 Downflume Installation						
Rip Rap Downflume (grouted)	3	each	$23,625.00	$70,875	31.9 acres @ 3 downflume = 3 downflume	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Install Downflume				**$70,875**		
15.05.22 Cap Drainage Syst Install'n					production rate = 47.5 LF/hr, RSM/SWL p. 77 (02510-850-0200)	
Install Cap Drainage System	13590	LF	$15.05	$204,530	31.9 acres	Actual Cost 2011 (Tri-C, Inc.)
Subt - Install Cap Drainage System				**$204,530**		Average of two bids (3rd bid disqualified due to non-conformity)
(Subt: Assemb 15.05.21 thru 15.05.22)				**$275,405**	downflume and drainage system installation	*cap cover area*

15.05 RMU-2 Landfill Closure (5-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.05.23 Groundwater Monitoring					production rate = 0.5 hours per sample for two techs; 21 wells; 2 events/12 months	
Monit'g Events & Samples/Event					0.0 quart'ly + 40 semi-ann + 1.0 b-ann'l x 1.05 each = 42.5 samp	includes 5% QA sampling
Technician	42.5	hours	$38.00	$1,615	42.5 samp @ 0.5 hrs/samp = 11.1 hours @ 2 units/crew = 42.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	42.5	samp	$25.00	$1,063	42.5 samples	bottles, shipping supplies
VOC Analysis (EPA 624)	42.5	samp	$105.00	$4,463		Average of three quotes
Subt - GW Mon During Closure				**$7,140**	*groundwater monitoring for twelve (12) months*	
(Subt: Assembly 15.05.23)				**$7,140**		
15.05.24 Leachate Management					leachate collected from surface and sub-surface projected to be mildly contaminated	
Onsite Aqueous Treatment	13694446	gals	$0.0178	$243,761	31.9 acres x 429,293 gal/acre = 13,694,446 gallons	17,000,000 gal = maximum volume of leachate for RMU-1 (39.6 acres) in past 10 years over 12 months closure. 17,000,000/39.6 = 429,293 gal/acre
Electricity for 40-gpm Pumps	0	kwh	$0.10	$0	2 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 0.0 pumps = 0.0 kwhs	40 gpm pump = 2 hp; 1.0 hph = .75 kwh
Electricity for 100-gpm Pumps	26280	kwh	$0.10	$2,628	5 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 6.0 pumps = 26,280 kwhs	100 gpm pump = 5 hp; 1.0 hph = .75 kwh
Electricity for 600-gpm Pump	26280	kwh	$0.10	$2,628	30 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 1.0 pump = 26,280 kwhs	600 gpm pump = 30 hp; 1.0 hph = .75 kwh
200 GPM Transfer Pump	1	each	$6,194.00	$6,194	1.0 pump =	2004 DEC Rate * Implicit Deflator
Fuel for 200-gpm Transfer Pump	1800	gals	$4.50	$8,100	2 gal/hr x 900 hrs/year x 1.0 pump = 1800 gals	fuel for transfer pump
Pump/Motor Replace/Maint/Repair	1.75	each	$2,294.00	$4,015	7 pumps x 25% factor = 1.75 events	2004 DEC Rate * Implicit Deflator
Subt - Leachate Management				**$267,326**	*leachate collection and management for twelve months*	
15.05.25 Leachate Monitoring					12 months of leachate monitoring	
Technician	60	hours	$38.00	$2,280	60 samp @ 0.5 hrs/samp = 30 hours @ 2 units/crew = 60 hours	Sampling Frequency from Schedule I, Exhibit F, Condition G
Sampling Supplies	60	samp	$5.00	$300	60 samples Included in unit rate	bottles, shipping supplies
Primary Leachate: PP VOCs (epa 624)	21	samp	$105.00	$2,205	4 samp/yr x 5 cells x 1.0 years 1.05 QA req't = 21 samples	analytical price: average of three quotes - permit specifications
Primary Leachate: PCBs (sw 8081)	10.5	samp	$131.67	$1,383	2 samp/yr x 5 cells x 1.0 years 1.05 QA req't = 10.5 samples	analytical price: average of three quotes - permit specifications
Primary Leachate: PP Metals (sw 6010)	10.5	samp	$155.00	$1,628	2 samp/yr x 5 cells x 1.0 years 1.05 QA req't = 10.5 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: VOCs (epa 624)	21	samp	$105.00	$2,205	4 samp/yr x 5 cells x 1.0 years 1.05 QA req't = 21 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: PP Organics	5.3	samp	$633.33	$3,357	1 samp/yr x 5 cells x 1.0 years 1.05 QA req't = 5.3 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: PP Metals (sw 6010)	5.3	samp	$155.00	$822	1 samp/yr x 5 cells x 1.0 years 1.05 QA req't = 5.3 samples	analytical price: average of three quotes - permit specifications
pH & conductivity	63	samp	$15.00	$945	12 samp/yr x 5 cells x 1.0 years 1.05 QA req't = 63 samples	analytical price: average of three quotes - permit specifications
Shipping	21	each	$5.00	$105		
Subt - Leachate Monitoring				**$15,228**	*leachate collection and management for twelve months*	CWM estimate for leachate monitoring for 6 months
(Subt: Assemb 15.05.24 thru 15.05.25)				**$282,554**		
15.05.26 PPE Usage & H&S Planning					Level C during waste grading, grading layer installation, and decon only.	
PPE Usage - Level D	1595	days	$0.00	$0	50 man days/ acre x 31.9 acres = 1,595 days	50 man days/acre to complete closure
PPE Usage - Mod Level C	0	days	$9.00	$0	0 days for Modified Level C	
PPE Usage - Level C	319	days	$25.00	$7,975	5 days/acre x 31.9 acres x 2 crew = 319 days	5 days for waste grading per acre, grading layer installation and equip decon
Health & Safety Officer	382.8	hours	$75.00	$28,710	15,312 hours @ 2.5% hr/hr = 382.8 hours	60 man days/acre * 8 hrs * 31.9 acres = 15312 hrs
Subt - PPE Usage/H&S Planning				**$36,685**		

15.05 RMU-2 Landfill Closure (5-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.05.27 Supervision						
Foreman	0	hours	$65.00	$0	Foreman included in per acre unit costs	
Site Project Manager	0	hours	$75.00	$0	Included in Construction Management costs	
Construction Management	31.9	acre	$4,500.00	$143,550	$4,500 per acre @ 31.9 acres	
Subtotal - Supervision				**$143,550**		
15.05.28 QA/QC Monitoring/Certification						
Final Cover						
GCL Conformance Testing	18.0	test	$235.00	$4,230	1,389,564 SF plus 25% lap factor = 1,736,955 SF @ 1 test/100000 SF = 18 tests	Actual Costs 2011 (TRI Environmental)
40-Mil Liner Conformance Testing	18.0	test	$98.00	$1,764	1,389,564 SF plus 25% lap factor = 1,736,955 SF @ 1 test/100000 SF = 18 tests	Actual Costs 2011 (TRI Environmental)
Geocomposite Liner Conformance Testing	18.0	test	$300.00	$5,400	1,389,564 SF plus 25% lap factor = 1,736,955 SF @ 1 test/100000 SF = 18 tests	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover GCL/Soil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover GCL/40-Mil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover 40-Mil/Geocomp)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover Geocomp/Soil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
QA/QC Monitoring/Certification	31.9	acre	$25,700.00	$819,830	31.9 acres	Actual cost 2010/2011 (Ensol, Inc.)
Subtotal - Certification				**$851,444**		
(Subt: Assemb 15.05.26 thru 15.05.28)				**$1,031,679**	*supervision, health & safety, and certification*	

15.05 RMU-2 Landfill Closure				**$11,057,406**	*CWM estimate based on 31.9 acres*

The Total Labor and Maintenance Costs per year to run the AWT Facility was calculated under the Site Wide Post Closure Plan and will remain constant regardless of whether or not RMU-2 is generating leachate; the labor, maintenance and number of days per year to run the facility will be the same. Therefore, no costs are associated with labor and maintenance.

15.05 RMU-2 Landfill Closure (5-Cells)

Cost Category	Proposed Percent of Direct Cost	Proposed 2011 Cost	Cost Range
Direct Costs/Basic Closure		$11,057,406	
Site Activity Management Costs	7.00%	$774,018	note: DEC uses 7%
Gen'l Contractor G&A/Home Office	4.00%	$442,296	note: DEC uses 4%
Pre-Construction Design Costs	6.00%	$663,444	note: DEC uses 6%
Engineering During Construction	2.00%	$221,148	note: DEC uses 2%
General Contractor Profit	6.00%	$663,444	Note DEC adds 6%
Indirect Costs/Basic Closure	25.00%	$2,764,352	
Subtotal - RMU-2 Landfill Closure		$13,821,758	
Plus Contingency	10.00%	$1,382,176	CWM and DEC 10%
Total - RMU-2 Landfill Closure		**$15,203,934**	

Cost Per Acre $476,612.34 *CWM estimate based on 31.9 acres*

Cost References:
"RSM/HC" refers to the RSMeans "Heavy Construction Cost Data", 2009 Edition (rates adjusted for inflation)
"RSM/UP" refers to the RSMeans "Environmental Remediation Cost Data - Unit Price", 2004 Edition (rates adjusted for inflation)
"RSM/BC" refers to the RSMeans "Building Construction Cost Data", 2003 Edition (rates adjusted for inflation)

Waste Area of RMU-2 (6 cells) : 38.5

Cell #	Acres	Cummulative Acres
20	6.9	6.9
18	6.2	13.1
19	6.4	19.5
17	5.9	25.4
16	6.5	31.9
15	6.6	38.5
Total Area	38.5	acres

Includes slope correction

Assumptions:

0.5 Grading Layer (Unclassified/General Fill)
Geosynthetic Clay Liner
40 mil roughened HDPE geomembrane
Geocomposite drainage layer
Eighteen inches (1.5 feet) of unclassified/general fill
Six inches (0.5 feet) topsoil and vegetative cover

Closure Scenarios - Assume Construction Sequence
Cell 20, 18, 19, 17, 16, 15

Closure Sequence	Convert Separation Berm to Perimeter Berm
Cell 20	1.1 Install Cut-off-Wall at outside toe-of-slope of the separator berm
Cell 20/18	1.2 Install perimeter berm
Cell 20/18/19	1.3 Install 3-foot compacted clay liner
Cell 20/18/19/17	1.4 Remove separator berm geosynthetics and clay
Cell 20/18/19/17/16	1.5 Install perimeter berm geosynthetics
Cell 20/18/19/17/16/15	

15.06 RMU-2 Landfill Closure (6-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References

Waste Cover Area Parameters 38.5 acres = 1,677,060 SF = 186,340 SY = 62,113 BCY @ 1' deep Includes slope correction

1-Cell Scenario (Cell 20)	6.9	6.9 acres = 300,564 SF = 33,396 SY	= 11,132 BCY @ 1' deep	= 5,566 BCY @ 0.5' deep	= 16,698 BCY @ 1.5' deep
2-Cell Scenario (Cells 18,20)	13.1	13.1 acres = 570,636 SF = 63,404 SY	= 21,135 BCY @ 1' deep	= 10,567 BCY @ 0.5' deep	= 31,702 BCY @ 1.5' deep
3-Cell Scenario (Cells 18,20,19)	19.5	19.5 acres = 849,420 SF = 94,380 SY	= 31,460 BCY @ 1' deep	= 15,730 BCY @ 0.5' deep	= 47,190 BCY @ 1.5' deep
4-Cell Scenario (Cells 18,20,19,17)	25.4	25.4 acres = 1,106,424 SF = 122,936 SY	= 40,979 BCY @ 1' deep	= 20,489 BCY @ 0.5' deep	= 61,468 BCY @ 1.5' deep
5-Cell Scenario (Cells 18,20,19,17,16)	31.9	31.9 acres = 1,389,564 SF = 154,396 SY	= 51,465 BCY @ 1' deep	= 25,733 BCY @ 0.5' deep	= 77,198 BCY @ 1.5' deep
6-Cell Scenario (Cells 18,20,19,17,16,15)	38.5	38.5 acres = 1,677,060 SF = 186,340 SY	= 62,113 BCY @ 1' deep	= 31,056 BCY @ 0.5' deep	= 93,170 CY @ 1.5' deep

Perimeter Ditch 6,500 linear feet

Drainage Tile System 16,400 linear feet 16,400/38.5 = 426 LF/acre

BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material

Material Pre-Qualification and Construction Testing Frequencies from RMU-2 Quality Assurance Manual and Technical Specifications (2013)

15.06.1 Final Waste Cover Grading					production rate = 250 cy/hr - based upon max of 12 inch depth	
Volume of Material to be Graded					62,113 BCY plus 25% comp fact = 77,641 LCY x 0% offsite mat'l = 0 LCY	no add'l mat'l; levelling/grading of existing waste pile only
Waste Grading	38.5	acre	$5,000.00	$192,500	38.5 acres	Contractor Rates/Site experience
Subt - Grading Final Waste Cover				**$192,500**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.06.2 Equipment Decontamination					production rate = 4 hours per unit with 2 man crew: 6 pieces of equipment	
Laborer	48	hours	$39.00	$1,872	6 units @ 4 hrs/unit = 24 hours @ 2 pers/crew = 48 hours	HASP req's two: loaded labor rate 2011 3rd party quote
Cleaning Solvent	6	gal	$4.00	$24	6 units @ 1 gal/unit = 6 gallons	site experience
Pressure Washer	24	hours	$4.04	$97	6 units @ 4 hrs/unit = 24 hours @ 1 units/crew = 24 hours	RSM/HC p. 471 (line item 01 54 33 40 5450)
PCB Solids/Debris Transport	4.8	mile	$3.50	$17	1 drum Solids/debris @ 80 drums/load = 0.0125 loads @ 385 miles/load = 4.8 miles	Rate: transporters quote/site experience
PCB Solids/Debris Disposal	1	drum	$100.00	$100	1 drum Solids/debris	HWC/ETC 2004 & CWM 2011 cost comparison industry pricing
Subt - Equipment Decontamination				**$2,110**		
15.06.3 Decon Water Samp/Dispose					production rate = 0.5 hours/sample for two techs	
Technician	1	hours	$38.00	$38	1.0 samp @ 0.5 hr/samp = 0.5 hours @ 2 pers/crew = 1.0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
VOC Analysis (EPA 624)	1	samp	$105.00	$105	1.0 areas @ 1.0 samp/area = 1.0 samples	analytical price: average of three quotes
On-site Water Disposal	1200	gal	$0.0313	$38	6 units @ 200 gal/unit/wa = 1200 gallons	200 gallons per unit/site experience
Subt - Decon Water Samp/Disposal				**$181**		
15.06.4 PCB Equipment Wipe					production rate = 0.5 hours/sample for two techs;2 wipe samples per unit/site experience	
Technician	12	hours	$38.00	$456	12.0 samp @ 0.5 hr/samp = 6.0 hours @ 2 pers/crew = 12.0 hours	HASP req's two: loaded labor rate 2011 3rd party quote
PCB Analysis (SW 8081/8082)	12	samp	$83.33	$1,000	6 units @ 2 samp/unit = 12.0 samples	analytical price: average of three quotes
Subt - PCB Wipe				**$1,456**		
15.06.5 Perimeter Ditch Spreading					Included in 15.06.6	
Subt - Spreading Ditch Fill				**$0.00**		
15.06.6 Perimeter Road/Ditch Compaction					Includes ditch excavation & road placement compaction	2010 Average of two bids
Subt - Compact Fin'l Cover/Ditch	6500	LF	$12.00	**$78,000**	Liner feet	
15.06.7 Final Cover/Ditch Inspection					Included in CQA 15.06.27	
Subt - Inspecting Final Cover/Ditch				**$0**		
(Subt: Assemblies 15.06.1 thru 15.06.7)				**$274,246**	*grading, compacting, & inspecting final waste pile layer; decon & testing of equipment*	*waste cover area*

15.06 RMU-2 Landfill Closure (6-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.06.8 Grading Layer					Based on 2009 Design & 38.5 acres to be closed	Grading layer 0.5 feet thick
General Fill	38821	CY	$11.00	$427,031	31,057 BCY plus 25% comp fact = 38,821 LCY x 100% offsite mat'l = 38,821 LCY	
General Fill Place/Compact	38821	CY	$10.00	$388,210	31,057 BCY plus 25% comp fact = 38,821 LCY x 100% offsite mat'l = 38,821 LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Grading Layer Surface Prep	38.5	acre	$10,000.00	$385,000	38.5 acres	Site Experience
Subt - Grading Layer				**$1,200,241**		
15.06.9 Cover Geosynthetic Clay Liner					Based on 2009 Design & 38.5 acres to be closed	
GCL Material	2084612	SF	$0.46	$958,922	1,677,690 SF plus 25% lap factor = 2,084,612 SF	2011 Actual Cost per SQFT including shipping & tax
GCL Installation	2084612	SF	$0.35	$729,614	1,677,690 SF plus 25% lap factor = 2,084,612 SF	2010 Quoted price from CETCO
Subt - GCL				**$1,688,536**		
(Subt: Assemblies 15.06.8 thru 15.06.9)				**$2,888,777**	*spread and compact grading layer (0.5' offsite material) and install of impervious GCL*	*cap cover area*

15.06.10 40-Mil Liner					production rate = 250 SF/Hr,	
40-Mil Polymeric Liner	2084612	SF	$0.21	$437,769	1,677,690 SF plus 25% lap factor = 2,084,612 SF	2010 Actual Cost per SQFT including tax & shipping
40-Mil Polymeric Liner Installation	2084612	SF	$0.46	$958,922	1,677,690 SF plus 25% lap factor = 2,084,612 SF	2010 Quoted price from CETCO
Subt - 40-Mil Liner				**$1,396,690**		
15.06.11 Liner Anchor Trench						
Anchor Trench	38.5	acres	$1,000.00	$38,500	38.5 acres remaining	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Anchor Trench				**$38,500**	*includes labor & equipment for trenching, backfilling, and compacting (3' x 1.5')*	
15.06.12 Geocomposite Drainage Layer					production rate = 5,000 SF/Hr, RSM/UP p. 9-83 (33-08-0513)	
Geocomposite Drainage Layer	2084612	SF	$0.38	$792,153	1,677,690 SF plus 25% lap factor = 2,084,612 SF	2011 Actual Blended cost (TN240 & TN350) including shipping & handling
Geocomposite Drainage Layer Install	2084612	SF	$0.32	$667,076		2010 Quoted price from CETCO
Subt - Geocomposite Layer				**$1,459,228**		
15.06.13 Geosynthetic Liner Testing					QC testing included in Assem 15.06.10; see assembly 15.06.27 for QA Monitoring	
Subt - Liner Testing			$0	**$0**	field testing crew required to work concurrently with liner placement crew in Assem 15.06.10	
(Subt: Assemb 15.06.10 thru 15.06.13)				**$2,894,418**	*installing geosynthetics above impervious gcl layer*	*liner area: cap cover plus 25% lap factor*

15.06.14 Unclassified Fill					depth = 1.5 feet (in one 18" lift) for final cover	
General Fill - offsite source	116462	LCY	$11	$1,281,082	93,170 BCY plus 25% comp fact = 116,462 LCY x 100% offsite mat'l = 116,462 LCY	Actual Quoted Cost 2011 (Tri-C, Inc.)
Subt - Spreading Unclassified Fill				**$1,281,082**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.06.15 Compacting Unclassified Fill					Compaction of one 1.5 feet lift	
Place/Spread/Compact Unclass. Fill	116462	LCY	$10	$1,164,620	93,170 BCY plus 25% comp fact = 116,462 LCY x 100% offsite mat'l = 116,462 LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Compacting Unclass. Fill				**$1,164,620**		
15.06.16 Unclassified Fill Testing						
Subt - Unclassified Fill Testing				**$0**	Included in Assemb 15.06.27 QA/QC Monitoring	

15.06 RMU-2 Landfill Closure (6-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.06.17 Unclassified Fill Test Fill					Assume two sources of unclassified fill	
Test Fill Construction	2	each	$12,000	$24,000	1 test fill/source @ 2 source/38.5 acres = 2 test fills	Actual Cost 2011 (Tri-C, Inc.)
Test Fill QA Testing/Reporting	2	each	$8,000	$16,000		Actual Cost 2011 (Ensol, Inc.)
Subt - Unclassified Fill Test Fill				**$40,000**		
(Subt: Assemb 15.06.14 thru 15.06.17)				**$2,485,702**	*spreading and compacting unclassifed fill layer; 1.5-feet in depth using 100% offsite material*	*cap cover area*
15.06.18 Spreading Topsoil					depth = 0.5 feet	
Topsoil	38821	LCY	$15.00	$582,315	31,057 BCY plus 25% comp fact = 38,821 LCY x 100% offsite mat'l = 38,821 LCY	Actual Cost 2011 (Tri-C, Inc.)
Spreading Topsoil	38821	LCY	$11.00	$427,031	31,057 BCY plus 25% comp fact = 38,821 LCY x 100% offsite mat'l = 38,821 LCY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Spreading Topsoil				**$1,009,346**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	Includes hydroseeding/mulch/fertilizer
15.06.19 Cap Vegetation						
Hydro Seeding w/Mulch & Fertilizer	0	MSF	0	$0	Included in Assemb 15.06.18	
Erosion Control Matting	10000	SY	$12.50	$125,000	9000 LF x 10 ft wide rolls = 90,000 SF / 9 SF/SY = 10,000 SY	Average of two bids (3rd bid disqualified due to non-conformity)
Subt -Cap Vegetation				**$125,000**		Drainage Tile System
(Subt: Assemb 15.06.18 thru 15.06.19)				**$1,134,346**	*placing topsoil and hydro seeding with mulch and fertilizer*	*cap cover area*
15.06.20 Downflume Installation						
Rip Rap Downflume (grouted)	3	each	$23,625.00	$70,875	38.5 acres @ 3 downflume = 3 downflume	Average of two bids (3rd bid disqualified due to non-conformity)
Subt - Install Downflume				**$70,875**		
15.06.21 Cap Drainage Syst Install'n					production rate = 47.5 LF/hr, RSM/SWL p. 77 (02510-850-0200)	
Install Cap Drainage System	16400	LF	$15.06	$246,984	38.5 acres	Actual Cost 2011 (Tri-C, Inc.)
Subt - Install Cap Drainage System				**$246,984**		Average of two bids (3rd bid disqualified due to non-conformity)
(Subt: Assemb 15.06.20 thru 15.06.21)				**$317,859**	downflume and drainage system installation	*cap cover area*
15.06.22 Groundwater Monitoring					production rate = 0.5 hours per sample for two techs; 29 wells; 2 events/12 months	
Monit'g Events & Samples/Event					0.0 quart'ly + 56.0 semi-ann + 1.0 b-ann'l x 1.05 each = 59.4 samp	includes 5% QA sampling
Technician	59.4	hours	$38.00	$2,257	59.4 samp @ 0.5 hrs/samp = 29.7 hours @ 2 units/crew = 59.4 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	59.4	samp	$25.00	$1,485	59.4 samples	bottles, shipping supplies
VOC Analysis (EPA 624)	59.4	samp	$105.00	$6,237		Average of three quotes
Subt - GW Mon During Closure				**$9,979**	*groundwater monitoring for twelve (12) months*	
(Subt: Assembly 15.06.22				**$9,979**		
15.06.23 Leachate Management					leachate collected from surface and sub-surface projected to be mildly contaminated	
Onsite Aqueous Treatment	16528780	gals	$0.0178	$294,212	38.5 acres x 429,293 gal/acre = 16527780 gals	17,000,000 gal = maximum volume of leachate for RMU-1 (39.6 acres) in past 10 years over 12 months closure. 17,000,000/39.6 = 429,293 gal/acre
Electricity for 40-gpm Pumps	0	kwh	$0.10	$0	2 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 0.0 pumps = 0.0 kwhs	40 gpm pump = 2 hp; 1.0 hph = .75 kwh
Electricity for 100-gpm Pumps	26280	kwh	$0.10	$2,628	5 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 6.0 pumps = 26,280 kwhs	100 gpm pump = 5 hp; 1.0 hph = .75 kwh
Electricity for 600-gpm Pump	26280	kwh	$0.10	$2,628	30 kw/pump x 8760 hrs/1.0 yr x 10% time on @ 1.0 pump = 157,680 kwhs	600 gpm pump = 30 hp; 1.0 hph = .75 kwh
200 GPM Transfer Pump	1	each	$6,194.00	$6,194	1.0 pump =	2004 DEC Rate * Implicit Deflator
Fuel for 200-gpm Transfer Pump	1800	gals	$4.50	$8,100	2 gal/hr x 900 hrs/year x 1.0 pump = 1800 gals	fuel for transfer pump
Pump/Motor Replace/Maint/Repair	2	each	$2,294.00	$4,588	8 pumps x 25% factor = 2.0 events	2004 DEC Rate * Implicit Deflator
Subt - Leachate Management				**$318,350**	*leachate collection and management for twelve months*	

15.06 RMU-2 Landfill Closure (6-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.06.24 Leachate Monitoring					12 months of leachate monitoring	Sampling Frequency from Schedule I, Exhibit F, Condition G
Technician	72	hours	$38.00	$2,736	72.0 samp @ 0.5 hrs/samp = 36.0 hours @ 2 units/crew = 72.0 hours	
Sampling Supplies	72	samp	$5.00	$360	72.0 samples	bottles, shipping supplies
Primary Leachate: PP VOCs (epa 624)	25.2	samp	$105.00	$2,646	4 samp/yr x 6 cells x 1.0 years 1.05 QA req't = 25.2 samples	analytical price: average of three quotes - permit specifications
Primary Leachate: PCBs (sw 8081)	25.2	samp	$131.67	$3,318	4 samp/yr x 6 cells x 1.0 years 1.05 QA req't = 25.2 samples	analytical price: average of three quotes - permit specifications
Primary Leachate: PP Metals (sw 6010)	12.6	samp	$155.00	$1,953	2 samp/yr x 6 cells x 1.0 years 1.05 QA req't = 12.6 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: VOCs (epa 624)	25.2	samp	$105.00	$2,646	4 samp/yr x 6 cells x 1.0 years 1.05 QA req't = 25.2 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: PP Organics	6.3	samp	$633.33	$3,990	1 samp/yr x 6 cells x 1.0 years 1.05 QA req't = 6.3 samples	analytical price: average of three quotes - permit specifications
Secondary Leach: PP Metals (sw 6010)	6.3	samp	$155.00	$977	1 samp/yr x 6 cells x 1.0 years 1.05 QA req't = 6.3 samples	analytical price: average of three quotes - permit specifications
pH & conductivity	75.6	samp	$15.00	$1,134	12 samp/yr x 6 cells x 1.0 years 1.05 QA req't = 75.6 samples	analytical price: average of three quotes - permit specifications
Shipping	75.6	each	$5.00	$378		
Subt - Leachate Monitoring				**$20,138**	*leachate collection and management for twelve months*	CWM estimate for leachate monitoring for 6 months
(Subt: Assemb 15.06.23 thru 15.06.24)				**$338,488**		
15.06.25 PPE Usage & H&S Planning					Level C during waste grading, grading layer installation, and decon only.	
PPE Usage - Level D	1925	days	$0.00	$0	50 man days/ acre x 38.5 acres = 1925 days	50 man days/acre to complete closure
PPE Usage - Mod Level C	0	days	$9.00	$0	0 days for Modified Level C	
PPE Usage - Level C	385	days	$25.00	$9,625	5.0 days/acre x 38.5 acres x 2 crew = 385 days	5 days for waste grading per acre, grading layer installation and equip decon
Health & Safety Officer	462	hours	$75.00	$34,650	18,480 hours @ 2.5% hr/hr = 462 hours	60 man days/acre * 8 hrs * 38.5 acres = 18480 hrs
Subt - PPE Usage/H&S Planning				**$44,275**		
15.06.26 Supervision						
Foreman	0	hours	$65.00	$0	Foreman included in per acre unit costs	
Site Project Manager	0	hours	$75.00	$0	Included in Construction Management costs	
Construction Management	38.5	acre	$4,500.00	$173,250	$4,500 per acre @ 38.5 acres	
Subtotal - Supervision				**$173,250**		
15.06.27 QA/QC Monitoring/Certification						
Final Cover						
GCL Conformance Testing	21.0	test	$235.00	$4,935	1677060 SF plus 25% lap factor = 2,084,612 SF @ 1 test/100000 SF = 21.0 tests	Actual Costs 2011 (TRI Environmental)
40-Mil Liner Conformance Testing	21.0	test	$98.00	$2,058	1677060 SF plus 25% lap factor = 2,084,612 SF @ 1 test/100000 SF = 21.0 tests	Actual Costs 2011 (TRI Environmental)
Geocomposite Liner Conformance Testing	21.0	test	$300.00	$6,300	1677060 SF plus 25% lap factor = 2,084,612 SF @ 1 test/100000 SF = 21.0 tests	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover GCL/Soil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover GCL/40-Mil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover 40-Mil/Geocomp)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Cover Geocomp/Soil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
QA/QC Monitoring/Certification	38.5	acre	$25,700.00	$989,450	38.5 acres	Actual cost 2010/2011 (Ensol, Inc.)
Subtotal - Certification				**$1,022,963**		
(Subt: Assemb 15.06.25 thru 15.06.27)				**$1,240,488**	*supervision, health & safety, and certification*	
15.06 RMU-2 Landfill Closure				**$11,584,303**	*CWM estimate based on 38.5 acres*	

The Total Labor and Maintenance Costs per year to run the AWT Facility was calculated under the Site Wide Post Closure Plan (Assembly 13.0) and will remain constant regardless of whether or not RMU-2 is generating leachate; the labor, maintenance and number of days per year to run the facility will be the same. Therefore, no costs are associated with labor and maintenance.

15.06 RMU-2 Landfill Closure (6 Cells)

Cost Category	Proposed Percent of Direct Cost	Proposed 2011 Cost	Cost Range
Direct Costs/Basic Closure		$11,584,303	
Site Activity Management Costs	7.00%	$810,901	note: DEC uses 7%
Gen'l Contractor G&A/Home Office	4.00%	$463,372	note: DEC uses 4%
Pre-Construction Design Costs	6.00%	$695,058	note: DEC uses 6%
Engineering During Construction	2.00%	$231,686	note: DEC uses 2%
General Contractor Profit	6.00%	$695,058	Note DEC adds 6%
Indirect Costs/Basic Closure	25.00%	$2,896,076	
Subtotal - RMU-2 Landfill Closure		$14,480,379	
Plus Contingency	10.00%	$1,448,038	CWM and DEC 10%
Total - RMU-2 Landfill Closure		**$15,928,417**	

Cost Per Acre $413,725.12 *CWM estimate based on 38.5 acres*

Cost References:
"RSM/HC" refers to the RSMeans "Heavy Construction Cost Data", 2009 Edition (rates adjusted for inflation)
"RSM/UP" refers to the RSMeans "Environmental Remediation Cost Data - Unit Price", 2004 Edition (rates adjusted for inflation)
"RSM/BC" refers to the RSMeans "Building Construction Cost Data", 2003 Edition (rates adjusted for inflation)

Waste Area of RMU-2 (6 cells) : 38.5

Cell #	Acres	Cummulative Acres
20	6.9	6.9
18	6.2	13.1
19	6.4	19.5
17	5.9	25.4
16	6.5	31.9
15	6.6	38.5
Total Area	38.5	acres

Includes slope correction

Assumptions:

0.5 Grading Layer (Unclassified/General Fill)
Geosynthetic Clay Liner
40 mil roughened HDPE geomembrane
Geocomposite drainage layer
Eighteen inches (1.5 feet) of unclassified/general fill
Six inches (0.5 feet) topsoil and vegetative cover

Closure Scenarios - Assume Construction Sequence
Cell 20, 18, 19, 17, 16, 15

Closure Sequence
Cell 20
Cell 20/18
Cell 20/18/19
Cell 20/18/19/17
Cell 20/18/19/17/16
Cell 20/18/19/17/16/15

15.A RMU-2 Landfill Closure 1-Cell (Berm)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References

Waste Cover Area Parameters		38.5 acres = 1,677,060 SF = 186,340 SY	= 62,113 BCY @ 1' deep	Includes slope correction		
1-Cell Scenario (Cell 20)	6.9	6.9 acres = 300,564 SF = 33,396 SY	= 11,132 BCY @ 1' deep	= 5,566 BCY @ 0.5' deep	= 16,698 BCY @ 1.5' deep	BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material
2-Cell Scenario (Cells 18,20)	13.1	13.1 acres = 570,636 SF = 63,404 SY	= 21,135 BCY @ 1' deep	= 10,567 BCY @ 0.5' deep	= 31,702 BCY @ 1.5' deep	
3-Cell Scenario (Cells 18,20,19)	19.5	19.5 acres = 849,420 SF = 94,380 SY	= 31,460 BCY @ 1' deep	= 15,730 BCY @ 0.5' deep	= 47,190 BCY @ 1.5' deep	
4-Cell Scenario (Cells 18,20,19,17)	25.4	25.4 acres = 1,106,424 SF = 122,936 SY	= 40,979 BCY @ 1' deep	= 20,489 BCY @ 0.5' deep	= 61,468 BCY @ 1.5' deep	
5-Cell Scenario (Cells 18,20,19,17,16)	31.9	31.9 acres = 1,389,564 SF = 154,396 SY	= 51,465 BCY @ 1' deep	= 25,733 BCY @ 0.5' deep	= 77,198 BCY @ 1.5' deep	
6-Cell Scenario (Cells 18,20,19,17,16,15)	38.5	38.5 acres = 1,677,060 SF = 186,340 SY	= 62,113 BCY @ 1' deep	= 62,113 BCY @ 1' deep	= 93,170 CY @ 1.5' deep	

Liner Feet of Separtor Berm Converted to Perimeter Berm		Cut-Off-Wall Length	
1-Cell Scenario (Cell 20)	575	1-Cell Scenario (Cell 20)	445
2-Cell Scenario (Cells 18,20)	1490	2-Cell Scenario (Cells 18,20)	1300
3-Cell Scenario (Cells 18,20,19)	1030	3-Cell Scenario (Cells 18,20,19)	960
4-Cell Scenario (Cells 18,20,19,17)	575	4-Cell Scenario (Cells 18,20,19,17)	515
5-Cell Scenario (Cells 18,20,19,17,16)	600	5-Cell Scenario (Cells 18,20,19,17,16)	500
6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A	6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A

Separator Berm, Perimeter Berm, and Cut-Off-Wall Lengths from RMU-2 Permit Drawing No. 5

Perimeter Ditch	2,290 linear feet	585+585+560+560 = 2,290
Drainage Tile System	2,939 linear feet	6.9 acres * 426 LF/acre = 2,939 LF

Material Pre-Qualification and Construction Testing Frequencies from RMU-2 Quality Assurance Manual and Technical Specifications (2013)

15.A.1 Cut-off-Wall Excavation					Excavation assume 80 CY yards per hour	
Cut-off-Wall Length	*445*	*feet*			Assume Cut-Off-Wall 3 ft wide by 10 ft deep	
Cut-off-Wall Volume	494.4	CY			Cell 20 = 445 ft x 3 ft x 10 ft = 13,350 CF = 494.4 CY	
Laborer	6.2	hours	$39.00	$242	494.4 CY @ 80 CY/hr = 6.2 hours @ 1 units/crew = 6.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	6.2	hours	$45.00	$279	494.4 CY @ 80 CY/hr = 6.2 hours @ 1 units/crew = 6.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Excavator	6.2	hours	$84.09	$521	494.4 CY @ 80 CY/hr = 6.2 hours @ 1 units/crew = 6.2 hours	RSM/HC p. 467 (line item 01 54 33 20 0320)
Driver	6.2	hours	$45.00	$279	494.4 CY @ 80 CY/hr = 6.2 hours @ 1 units/crew = 6.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (20-cy load)	6.2	hours	$24.78	$154	494.4 CY @ 80 CY/hr = 6.2 hours @ 1 units/crew = 6.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Subt - Cut Off Wall Excavation				**$1,475**		
15.A.2 Slurry Wall Installation					Assume 10 ft deep and 3 ft wide	
Slurry Wall Length	445	LF			445 LF * 10 ft * 3ft = 13,350 CF	Backfilled with 3000psi concrete, no reinforcing steel. Includes O&P.
Slurry Wall Instllation	13350	CF	$23.50	$313,725		Taken from 2009 Means Section 31 56 23.2
Subt - Slurry Wall Installation				**$313,725**		
(Subt: Assemb 15.A.1 thru 15.A.2)				**$315,200**		

PERIMETER BERM:

15.A.3 Pre-Qual Gnl Fill Mat'l Testing					1 per source 10 ft tall	
Perimeter Berm Length	575	FT			Cell 20 Perimeter Berm 575 feet in length at 25 wide at top and 2:1 outside slope and 3:1 inside slope	20.7 CY/ft
Calculation of LCYs in Berm Area	14878	LCY			*11,902 BCY x 1.25 swell factor = 14,878 LCY*	
Technician	1	hour	$38.00	$38	1 samp @ 0.5 hrs/samp = 0.5 hours @ 2.0 units/crew = 1 hours	technician rate: rate 2011 3rd party quote
Moisture Content	1	test	$12.00	$12	14,878 LCY @ 1 test per source = 1.0 test	Actual Costs 2011 (TRI Environmental)
Sieve Analysis w/o hydrometer	1	test	$70.00	$70	14,878 LCY @ 1 test per source = 1.0 test	Actual Costs 2011 (TRI Environmental)
Atteberg Limits	1	test	$65.00	$65	14,878 LCY @ 1 test per source = 1.0 test	Actual Costs 2011 (TRI Environmental)
Proctor Compaction	1	test	$120.00	$120	14,878 LCY @ 1 test per source = 1.0 test	Actual Costs 2011 (TRI Environmental)
Direct Shear	1	test	$500.00	$500	14,878 LCY @ 1 test per source = 1.0 test	Actual Costs 2011 (TRI Environmental)
Subt - Pre-Qual Berm Mat'l Testing				**$805**		

15.A RMU-2 Landfill Closure 1-Cell (Berm)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.A.4 Berm General Fill Spreading					production rate = 125 cy/hr, RSM/SWL p. 57 (02315-505-0010); depth = 10 feet (in 12-inch lifts)	
Laborer	59.5	hour	$39.00	$2,321	14,878 LCY @ 125 LCY/hr = 119.0 hours @ 0.5 units/crew = 59.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	238	hour	$45.00	$10,710	14,878 LCY @ 125 LCY/hr = 119.0 hours @ 2 units/crew = 238 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Loader, Track	119	hour	$30.03	$3,574	14,878 LCY @ 125 LCY/hr = 119.0 hours @ 1 units/crew = 119.0 hours	RSM/HC p. 469 (line item 01 54 33 20 4730)
Dozer (200 hp)	119	hour	$56.38	$6,709	14,878 LCY @ 125 LCY/hr = 119.0 hours @ 1 units/crew = 119.0 hours	RSM/HC p. 468 (line item 01 54 33 20 4260)
Dump Truck (20-ton load)	238	hour	$24.78	$5,898	14,878 LCY @ 125 LCY/hr = 119.0 hours @ 2 units/crew = 238 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Driver	238	hour	$45.00	$10,710	14,878 LCY @ 125 LCY/hr = 119.0 hours @ 2 units/crew = 238 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
General Fill	14878	LCY	$11.00	$163,658	11,902 BCY plus 25% comp fact = 14,878 LCY x 100% offsite mat'l = 14,878 LCY	3rd party quote for RMU-1 final cover construction Assb. 14.0
Subt - Spreading Berm Gnl Fill				**$203,579**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.A.5 Berm Gnl Fill Compaction					production rate = 165 cy/hr, RSM/SWL p. 52 (02315-300-5640); depth = 30 feet (in 12-inch lifts)	
Laborer	45.1	hour	$39.00	$1,759	14,878 LCY @ 165 LCY/hr = 90.2 hours @ 0.5 units/crew = 45.1 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	112.8	hour	$45.00	$5,076	14,878 LCY @ 165 LCY/hr = 90.2 hours @ 1.25 units/crew = 112.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Landfill Compactor (220 hp)	902	hour	$75.60	$68,191	14,878 LCY @ 165 LCY/hr = 90.2 hours @ 1 units/crew = 90.2 hours	RSM/HC p. 468 (line item 01 54 33 20 3300)
Vibratory Steel Drum, Diesel	9.02	hour	$25.70	$232	14,878 LCY @ 165 LCY/hr = 90.2 hours @ 10.0% top lift only = 9.02 hours	RSM/HC p. 468 (line item 01 54 33 20 3320)
Subt - Compacting Berm Gnl Fill				**$75,258**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.A.6 General Fill Testing					one samples per 600 CY; 10 twelve-inch lifts; 10 feet of depth; 0.25 hrs/samp for 1 techs	
Technician	6.2	hour	$38.00	$236	24.8 samp @ 0.25 hrs/samp = 6.2 hours @ units/crew = 6.2 hours	technician rate: rate 2011 3rd party quote
Insitu Nuclear Density Test	24.8	test	$39.00	$967	14,878 BCY @ 1 sample per 600 CY = 24.8 tests	
Subt - General Fill Testing				**$1,203**		
(Subt: Assemb 15.A.3 thru 15.A.6)				**$280,845**		

15.A.7 Pre-Qual Clay Mat'l Testing					one sample per 1,000 LCY of base liner area	
Calculation of LCYs in Cap Area					*5,578 BCY @ 3 'depth x 1.35 swell factor = 7,530.3 LCY*	9.7 CY/LF @ 575 LF
Technician	8.0	hour	$38.00	$304	8.0 samp @ 0.5 hrs/samp = 4.0 hours @ 2.0 units/crew = 8 hours	technician rate: rate 2011 3rd party quote
Moisture Content	8.0	test	$12.00	$96	7,530 LCY @ 1 test per 1000 LCY = 8.0 tests	Actual Costs 2011 (TRI Environmental)
Sieve Analysis w/o hydrometer	8.0	test	$70.00	$560	7,530 LCY @ 1 test per 1000 LCY = 8.0 tests	Actual Costs 2011 (TRI Environmental)
Sieve Analysis w/ hydrometer	2.0	test	$100.00	$200	7,530 LCY @ 1 test per 5000 LCY = 2.0 tests	Actual Costs 2011 (TRI Environmental)
Atteberg Limits	8.0	test	$65.00	$520	7,530 LCY @ 1 test per 1000 LCY = 8.0 tests	Actual Costs 2011 (TRI Environmental)
Proctor Compaction	2.0	test	$120.00	$240	7,530 LCY @ 1 test per 5000 LCY = 2.0 tests	Actual Costs 2011 (TRI Environmental)
Laboratory Hydraulic Conductivity	1.0	test	$198.00	$198	7,530 LCY @ 1 test per Source = 1.0 tests	Actual Costs 2011 (TRI Environmental)
Direct Shear	2.0	test	$500.00	$1,000	7,530 LCY @ 1 test per 5000 LCY = 2.0 tests	Actual Costs 2011 (TRI Environmental)
Subt - Pre-Qual Clay Mat'l Testing				**$3,118**		

15.A RMU-2 Landfill Closure 1-Cell (Berm)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.A.8 Clay Test Pad Testing					production rate = 125 cy/hr, RSM/SWL p. 57 (02315-505-0010); depth = 2 feet (in 6-inch lifts)	
Calculation of Test Pad Area					*60 ft. long x 20 ft. wide x 2 ft. deep = 2400 BCF = 89 BCY*	
Laborer	1.0	hours	$39.00	$39	120.0 LCY @ 125 LCY/hr = 1.0 hours @ 1 units/crew = 1.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	2.9	hours	$45.00	$131	120.0 LCY @ 125 LCY/hr = 1.0 hours @ 3 units/crew = 2.9 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Loader, Track	1.0	hours	$30.03	$30	120.0 LCY @ 125 LCY/hr = 1.0 hours @ 1 units/crew = 1.0 hours	RSM/HC p. 469 (line item 01 54 33 20 4730)
Dozer (200 hp)	1.0	hours	$56.38	$56	120.0 LCY @ 125 LCY/hr = 1.0 hours @ 1 units/crew = 1.0 hours	RSM/HC p. 468 (line item 01 54 33 20 4260)
Landfill Compactor (220 hp)	1.0	hours	$75.60	$76	120.0 LCY @ 125 LCY/hr = 0.0 hours @ 1 units/crew = 0.0 hours	RSM/HC p. 468 (line item 01 54 33 20 3300)
Clay Fill	120.0	LCY	$18.00	$2,160	88.9 BCY plus 35% comp fact = 120.0 LCY x 100% offsite mat'l = 120.0 LCY	2009 RSMeans $9.85 Borrow and load + $8.15 haul.
Technician	76.0	hour	$38.00	$2,888	76.0 samp @ 0.5 hrs/samp = 38.0 hours @ 2 units/crew = 76.0 hours	technician rate: rate 2011 3rd party quote
Boutwell Insitu Permeability Test	2.0	test	$550.00	$1,100	2 req'd by permit	Equipment charges
Insitu Nuclear Density Test	32.0	test	$39.00	$1,248	32 req'd by permit	
Moisture Content	6.0	test	$12.00	$72	6 req'd by permit	Actual Costs 2011 (TRI Environmental)
Sieve Analysis w/o hydrometer	6.0	test	$70.00	$420	6 req'd by permit	Actual Costs 2011 (TRI Environmental)
Atteberg Limits	6.0	test	$65.00	$390	6 req'd by permit	Actual Costs 2011 (TRI Environmental)
Proctor Compaction	6.0	test	$120.00	$720	6 req'd by permit	Actual Costs 2011 (TRI Environmental)
Laboratory Hydraulic Conductivity	6.0	test	$198.00	$1,188	6 req'd by permit	Actual Costs 2011 (TRI Environmental)
Soil Classification	6.0	test	$10.00	$60	6 req'd by permit	Actual Costs 2011 (TRI Environmental)
Organic Content	6.0	test	$55.00	$330	6 req'd by permit	Actual Costs 2011 (TRI Environmental)
Subt - Clay Test Pad Testing				**$10,908**		
15.A.9 Clay Layer Spreading					production rate = 125 cy/hr, RSM/SWL p. 57 (02315-505-0010); depth = 3 feet (in 6-inch lifts)	
Laborer	30.1	hours	$39.00	$1,174	7,530 LCY @ 125 LCY/hr = 60.2 hours @ 0.5 units/crew = 30.1 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	120.4	hours	$45.00	$5,418	7,530 LCY @ 125 LCY/hr = 60.2 hours @ 2 units/crew = 120.4 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Loader, Track	60.2	hours	$30.03	$1,808	7,530 LCY @ 125 LCY/hr = 60.2 hours @ 1 units/crew = 60.2 hours	RSM/HC p. 469 (line item 01 54 33 20 4730)
Dozer (200 hp)	60.2	hours	$56.38	$3,394	7,530 LCY @ 125 LCY/hr = 60.2 hours @ 1 units/crew = 60.2 hours	RSM/HC p. 468 (line item 01 54 33 20 4260)
Clay Fill	7530.0	LCY	$18.00	$135,540	5,578 BCY plus 35% comp fact = 7,530 LCY x 100% offsite mat'l = 7,530 LCY	
Subt - Spreading Clay Layer				**$147,334**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.A.10 Clay Layer Compaction					production rate = 165 cy/hr, RSM/SWL p. 52 (02315-300-5640); depth = 3 feet (in 6-inch lifts)	
Laborer	22.8	hours	$39.00	$889	7,530 LCY @ 165 LCY/hr = 45.6 hours @ 0.5 units/crew = 22.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	57.0	hours	$45.00	$2,565	7,530 LCY @ 165 LCY/hr = 45.6 hours @ 1.25 units/crew = 57 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Landfill Compactor (220 hp)	22.8	hours	$75.60	$1,724	7,530 LCY @ 165 LCY/hr = 45.6 hours @ 1 units/crew = 22.8 hours	RSM/HC p. 468 (line item 01 54 33 20 3300)
Vibratory Steel Drum, Diesel	7.6	hours	$25.70	$195	7,530 LCY @ 165 LCY/hr = 45.6 hours @ 16.7% top lift only = 7.6 hours	RSM/HC p. 468 (line item 01 54 33 20 3320)
Subt - Compacting Clay Layer				**$5,373**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.A.11 Clay Layer Testing					nine samples per 6-inch lift per acre; 6 six-inch lifts; three feet of depth; 0.25 hrs/samp for 2 techs	
Technician	32.4	hours	$38.00	$1,231	64.8 samp @ 0.25 hrs/samp = 16.2 hours @ 2 units/crew = 32.4 hours	technician rate: rate 2011 3rd party quote
Insitu Nuclear Density Test	64.8	test	$39.00	$2,527	1.2 acres x 6 6-in lifts @ 9 tests per acre per lift = 64.8 tests	
Laboratory Hydraulic Conductivity	7.2	test	$198.00	$1,426	1.2 acres x 6 6-in lifts @ 1 tests per acre per lift = 7.2 tests	Actual Costs 2011 (TRI Environmental)
Sieve Analysis w/o hydrometer	7.2	test	$70.00	$504		Actual Costs 2011 (TRI Environmental)
Atteberg Limits	7.2	test	$65.00	$468		Actual Costs 2011 (TRI Environmental)
Moisture Percent	7.2	test	$12.00	$86		Actual Costs 2011 (TRI Environmental)
Subt - Clay Layer Testing				**$6,242**	*spreading and compacting impervious clay layer; 3-feet in depth using 100% offsite material*	
(Subt: Assemb 15.A.7 thru 15.A.11)				**$172,975**		

15.A RMU-2 Landfill Closure 1-Cell (Berm)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.A.12 Remove Separator Berm						
Separator Berm Length	445	LF			Excavation assume 80 CY yards per hour	
Separator Berm Volume	4138	CY			Assume 10ft High x 5ft wide at top x 2H:1V side slopes = 250 CF/LF /27= 9.3 CY/LF	
Calculation of LCYs in Berm Area	5173	LCY			*4,138 BCY x 1.25 swell factor = 5,173 LCY*	
Laborer	64.6	hours	$39.00	$2,519	5,173 CY @ 80 CY/hr = 64.6 hours @ 1 units/crew = 64.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	64.6	hours	$45.00	$2,907	5,173 CY @ 80 CY/hr = 64.6 hours @ 1 units/crew = 64.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Excavator	64.6	hours	$84.09	$5,432	5,173 CY @ 80 CY/hr = 64.6 hours @ 1 units/crew = 64.6 hours	RSM/HC p. 467 (line item 01 54 33 20 0320)
Driver	64.6	hours	$45.00	$2,907	5,173 CY @ 80 CY/hr = 64.6 hours @ 1 units/crew = 64.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dump Truck (20-cy load)	64.6	hours	$24.78	$1,601	5,173 CY @ 80 CY/hr = 64.6 hours @ 1 units/crew = 64.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Disposal of geo synthetics	0	Ton	$0.00	$0	Assumed disposed in active cell	
Disposal of Operation stone	0	CY	$0.00	$0	Assumed disposed in active cell	
Clay soils	0	CY	$0.00	$0	Will be re-used	
Subt - Berm Removal				**$15,366**		
(Subt: Assemb 15.A.12)				**$15,366**		
15.A.13 Install perimeter berm Liner System						
Base Liner						
Interface Friction Testing (Base GCL/NW-textile)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Base GCL/80-Mil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Base 80-Mil/Geocomp)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Base Clay/80-Mil)	1	test	$5,055.00	$5,055	1 test per material type/source	Actual Costs 2011 (TRI Environmental)
Subtotal - Certification				**$20,220**		
15.A.14 Secondary 80-mil Geomembrane					575 FT long berm by 92 feet from top of slope to tie-in to base liner = 52,900 SF	
Conformance Testing	1	test	$98.00	$98	66,125 SF @ 1 test/100K = 1.0 tests	Actual Costs 2011 (TRI Environmental)
Material	66125	SF	$0.48	$31,740	52,900 SF plus 25% lap factor = 66,125 SF	2011 Price Quote
Installation	66125	SF	$0.83	$54,884	52,900 SF plus 25% lap factor = 66,125 SF	2011 Price Quote
Subt - Secondary 80-mil Geomembrane				**$86,722**		
15.A.15 Geocomposite						
Conformance Testing	1	test	$300.00	$300	66,125 SF @ 1 test/100K = 1.0 tests	Actual Costs 2011 (TRI Environmental)
Material	66125	SF	$0.38	$25,128	52,900 SF plus 25% lap factor = 66,125 SF	2011 Actual Blended cost (TN240 & TN350) including shipping & handling
Installation	66125	SF	$0.32	$21,160	52,900 SF plus 25% lap factor = 66,125 SF	2010 Average of two bids
Subt - Geocomposite				**$46,588**		
15.A.16 Secondary Granular layer					production rate = 125 cy/hr, RSM/SWL p. 57 (02315-505-0010); depth = 1 foot (in one 12-inch lift)	
Quantity					1-foot thick granular layer: 445 ft cell floor by 50 ft width = 22,250 CF/27 = 824 CY	
Pre-Qualification Testing				$0		
Laborer	6.6	hour	$39.00	$257	824 CY @ 125 LCY/hr = 6.6 hours @ 1.0 units/crew = 6.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	6.6	hour	$45.00	$297	824 CY @ 125 LCY/hr = 6.6 hours @ 1.0 units/crew = 6.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dozer (200 hp)	6.6	hour	$56.38	$372	824 CY @ 125 LCY/hr = 6.6 hours @ 1.0 units/crew = 6.6 hours	RSM/HC p. 468 (line item 01 54 33 20 4260)
Granular Fill	824	CY	$27.53	$22,685	824 CY @ 100% offsite mat'l = 824 CY @	
Subt - Secondary Granular Layer				**$23,611**		

15.A RMU-2 Landfill Closure 1-Cell (Berm)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.A.17 Non-Woven Geotextile						
Conformance Testing	1	test	$247.00	$247	66,125 SF @ 1 test/100K = 1.0 tests	Actual Costs 2011 (TRI Environmental)
Material	66125	SF	$0.16	$10,580	52,900 SF plus 25% lap factor = 66,125 SF	
Installation	66125	SF	$0.12	$7,935	52,900 SF plus 25% lap factor = 66,125 SF	
Subt - Non-Woven Geotextile				**$18,762**		
15.A.18 GCL					445 ft cell floor by 50 ft floor width & 15 ft up slope = 28,925 SF	
Conformance Testing	1	test	$235.00	$235	36,156 SF @ 1 test/100K = 1.0 tests	Actual Costs 2011 (TRI Environmental)
Material	36156	SF	$0.46	$16,632	28,925 SF plus 25% lap factor = 36,156 SF	2011 Actual Cost per SQFT including shipping & tax
Installation	36156	SF	$0.35	$12,655	28,925 SF plus 25% lap factor = 36,156 SF	2010 Average of two bids
Subt - GCL				**$29,521**		
15.A.19 Primary 80-mil Geomembrane						
Conformance Testing	1	test	$98.00	$98	66,125 SF @ 1 test/100K = 1.0 tests	Actual Costs 2011 (TRI Environmental)
Material	66125	SF	$0.48	$31,740	52,900 SF plus 25% lap factor = 66,125 SF	2011 Price Quote
Installation	66125	SF	$0.83	$54,884	52,900 SF plus 25% lap factor = 66,125 SF	2011 Price Quote
Destructive Testing				$0		
Subt - Primary 80-mil Geomembrane				**$86,722**		
15.A.20 Geocomposite						
Conformance Testing	1	test	$300.00	$300	66,125 SF @ 1 test/100K = 1.0 tests	Actual Costs 2011 (TRI Environmental)
Material	66125	SF	$0.38	$25,128	52,900 SF plus 25% lap factor = 66,125 SF	2011 Actual Blended cost (TN240 & TN350) including shipping & handling
Installation	66125	SF	$0.32	$21,160	52,900 SF plus 25% lap factor = 66,125 SF	2010 Average of two bids
Subt - Geocomposite				**$46,588**		
15.A.21 Granular layer					production rate = 125 cy/hr, RSM/SWL p. 57 (02315-505-0010); depth = 1 foot (in one 12-inch lift)	
Quantity					1-foot thick granular layer: 445 ft cell floor by 50 ft width = 22,250 CF/27 = 824 CY	
Pre-Qualification Testing				$0		
Laborer	6.6	hour	$39.00	$257	824 CY @ 125 LCY/hr = 6.6 hours @ 1.0 units/crew = 6.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	6.6	hour	$45.00	$297	824 CY @ 125 LCY/hr = 6.6 hours @ 1.0 units/crew = 6.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dozer (200 hp)	6.6	hour	$56.38	$372	824 CY @ 125 LCY/hr = 6.6 hours @ 1.0 units/crew = 6.6 hours	RSM/HC p. 468 (line item 01 54 33 20 4260)
Material	824	CY	$27.53	$22,685	824 CY @ 100% offsite mat'l = 824 CY	
Subt - Primary Granular Layer				**$23,611**		
15.A.22 Non-Woven Geotextile						
Conformance Testing	1	test	$247.00	$247	66,125 SF @ 1 test/100K = 1.0 tests	Actual Costs 2011 (TRI Environmental)
Material	66125	SF	$0.16	$10,580	52,900 SF plus 25% lap factor = 66,125 SF	
Installation	66125	SF	$0.12	$7,935	52,900 SF plus 25% lap factor = 66,125 SF	
Subt - Non-Woven Geotextile				**$18,762**		

15.A RMU-2 Landfill Closure 1-Cell (Berm)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.A.23 Select Fill (Ops Layer)						
Quantity - Cell Floor					1-foot thick select fill layer: 445 ft cell floor by 50 ft width = 22,250 CF/27 = 824 CY	
Quantity - Side Slope					2-foot thick select fill layer: 575 ft cell side slope by 42 ft width = 48,300 CF/27 = 1,789 CY	
Pre-Qualification Testing				$0		
Laborer	20.9	hour	$39.00	$815	2613 CY @ 125 LCY/hr = 20.9 hours @ 1.0 units/crew = 20.9 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	20.9	hour	$45.00	$941	2613 CY @ 125 LCY/hr = 20.9 hours @ 1.0 units/crew = 20.9 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Dozer (200 hp)	20.9	hour	$56.38	$1,178	2613 CY @ 125 LCY/hr = 20.9 hours @ 1.0 units/crew = 20.9 hours	RSM/HC p. 468 (line item 01 54 33 20 4260)
Select Fill	2613	CY	$24.83	$64,881	2613 CY @ 100% offsite mat'l = 2613 CY	
Subt - Select Fill (Ops Layer)				**$67,815**		
(Subt: Assemb 15.A.13 thru 15.A.23)				**$468,921**		
15.A.24 Clay Liner Anchor Trench Perimeter Road					production rate = 125 cy/hr, RSM/SWL p. 57 (02315-505-0010); depth = 1 foot (in 6-inch lifts)	
Quantity					20 ft by 575 ft long perimeter berm and one ft (2 six-inch lifts) = 426 CY	Permit Drawings 5 and 15
Laborer	2.3	hour	$39.00	$90	575 LCY @ 125 LCY/hr = 4.6 hours @ 0.5 units/crew = 2.3 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	9.2	hour	$45.00	$414	575 LCY @ 125 LCY/hr = 4.6 hours @ 2 units/crew = 9.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Loader, Track	4.6	hour	$30.03	$138	575 LCY @ 125 LCY/hr = 4.6 hours @ 1 units/crew = 4.6 hours	RSM/HC p. 469 (line item 01 54 33 20 4730)
Dozer (200 hp)	4.6	hour	$56.38	$259	575 LCY @ 125 LCY/hr = 4.6 hours @ 1 units/crew = 4.6 hours	RSM/HC p. 468 (line item 01 54 33 20 4260)
Clay Fill	575	LCY	$18.00	$10,350	426 BCY plus 35% comp fact = 575 LCY x 100% offsite mat'l = 575 LCY	
Subt - Spreading Clay Layer				**$11,251**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.A.25 Clay Layer Compaction					production rate = 165 cy/hr, RSM/SWL p. 52 (02315-300-5640); depth = 1 foot (in 6-inch lifts)	
Laborer	1.8	hour	$39.00	$70	575 LCY @ 165 LCY/hr = 3.5 hours @ 0.5 units/crew = 1.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Equipment Operator (Medium)	4.4	hour	$45.00	$198	575 LCY @ 165 LCY/hr = 3.5 hours @ 1.25 units/crew = 4.4 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Landfill Compactor (220 hp)	3.5	hour	$75.60	$265	575 LCY @ 165 LCY/hr = 3.5 hours @ 1 units/crew = 3.5 hours	RSM/HC p. 468 (line item 01 54 33 20 3300)
Vibratory Steel Drum, Diesel	1.8	hour	$25.70	$46	575 LCY @ 165 LCY/hr = 3.5 hours @ 50% top lift only = 1.8 hours	RSM/HC p. 468 (line item 01 54 33 20 3320)
Subt - Compacting Clay Layer				**$579**	*BCY = bank (in situ) compacted material; LCY = loose (ex situ) uncompacted material*	
15.A.26 Clay Layer Testing					nine samples per 6-inch lift per acre; two six-inch lifts; one foot of depth; 0.25 hrs/samp for 2 techs	
Technician	10	hour	$38.00	$380	20 samp @ 0.25 hrs/samp = 5.0 hours @ 2 units/crew = 10.0 hours	technician rate: rate 2011 3rd party quote
Insitu Nuclear Density Test	18	test	$39.00	$702	0.25 acres x 2 6-in lifts @ 9 tests per lift = 18.0 tests	
Laboratory Hydraulic Conductivity	2	test	$198.00	$396	0.25 acres x 2 6-in lifts @ 1 tests per lift = 2.0 tests	Actual Costs 2011 (TRI Environmental)
Sieve Analysis w/o hydrometer	2	test	$70.00	$140	0.25 acres x 2 6-in lifts @ 1 tests per lift = 2.0 tests	Actual Costs 2011 (TRI Environmental)
Atteberg Limits	2	test	$65.00	$130	0.25 acres x 2 6-in lifts @ 1 tests per lift = 2.0 tests	Actual Costs 2011 (TRI Environmental)
Moisture Percent	2	test	$12.00	$24	0.25 acres x 2 6-in lifts @ 1 tests per lift = 2.0 tests	Actual Costs 2011 (TRI Environmental)
Wet Density	2	test	$110.00	$220	0.25 acres x 2 6-in lifts @ 1 tests per lift = 2.0 tests	Actual Costs 2011 (TRI Environmental)
Dry Density	2	test	$110.00	$220	0.25 acres x 2 6-in lifts @ 1 tests per lift = 2.0 tests	Actual Costs 2011 (TRI Environmental)
Subt - Clay Layer Testing				**$2,212**		
(Subt: Assemb 15.A.24 thru 15.A.26)				**$14,042**	*spreading and compacting impervious clay layer; 1-feet in depth using 100% offsite material*	

15.A RMU-2 Landfill Closure 1-Cell (Berm)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
15.A.27 QA/QC Monitoring/Certification						
Base Liner						
QA/QC Monitoring/Certification	3	acre	$25,700.00	$77,100	52,900 SF per layer x 2 layers = 105,800 SF = 2.5 acres. Say approximately 3 acres.	Actual cost 2010/2011 (Ensol, Inc.)
Subtotal - Certification				**$77,100**		
(Subt: Assemb 15.A.27)				**$77,100**		
15.A Perimeter Berm Construction				**$1,344,449**		
(estimated cost per linear foot)	*575.0*	*LF @*	***$ 2,338.17***	***n/a***	*converting cell separator berm to perimeter berm for closure prior to full buildout Cell 20*	

Unit Rates RMU-2
Closure Cost Estimate
CWM Chemical Services, LLC, Model City, New York

2011 Unit Rates are based on actual costs for contractor capping 10.0 acres of RMU-1 during Phase VII Final Cover construction.

Basis:

UNIT RATES (THIRD PARTY COSTS)

RMU-1 CLOSURE		**2011**		**Basis of Production and Quantities for In-House Estimate**
		UOM	Price	
WASTE GRADING				
Final waste grading & surface preparation:		acre	$ 5,000	Actual 2010 costs/site experience using site personnel
GRADING LAYER				
Load, haul, place, grade, grading layer:		CY	$ 10.00	Actual Quoted Cost 2011 (Tri-C, Inc.) for placement of grading layer ($10/CY)
Purchase/delivery of general fill from off-site source =		CY	$ 11.00	Actual Quoted Cost 2011 (Tri-C, Inc.) for providing of grading layer ($11/CY)
Grading layer surface preparation:		acre	$ 10,000.00	Actual cost incurred for 2010 activities
EARTHWORKS CONTRACTOR MOB/DEMOB		acre	$ 37,750.00	Average of two bids (third bid disqualified due to non-conformity)
GEOSYNTHETICS				
Geosynthetic Clay Liner (GCL)				
Material Cost		SQFT	$ 0.46	2011 Actual Cost per SQFT including shipping & tax
Installation Cost		SQFT	$ 0.35	2010 Average of two bids
Subtotal		**SQFT**	**$ 0.81**	
GEOSYNTHETICS CONTRACTOR MOB/DEMOB		acre	$ 13,750.00	2010 Average of two bids
40 mil Roughened HDPE geomembrane (textured 2 sided)				
Material Cost		SQFT	$ 0.21	2010 Actual Cost per SQFT including tax & shipping
Installation Cost		SQFT	$ 0.46	2010 Average of two bids
Subtotal		**SQFT**	**$ 0.67**	
80 mil Roughened HDPE geomembrane (textured 2 sided)				
Material Cost		SQFT	**$ 0.48**	
Installation Cost		SQFT	**$ 0.83**	
Subtotal		**SQFT**		
Geosynthetic Installation at Standpipe Riser		**each**	**$ 1,000.00**	Average of two bids (third bid disqualified due to non-conformity)
Geosynthetic Installation at Riser Vault		**each**	**$ 1,000.00**	Average of two bids (third bid disqualified due to non-conformity)
Geocomposite				
Material Cost		SQFT	$ 0.38	2011 Actual Blended cost (TN240 & TN350) including shipping & handling
Installation Cost (w/Sewing)		SQFT	$ 0.32	2010 Average of two bids
Subtotal		**SQFT**	**$ 0.70**	

Unit Rates RMU-2
Closure Cost Estimate
CWM Chemical Services, LLC, Model City, New York

2011 Unit Rates are based on actual costs for contractor capping 10.0 acres of RMU-1 during Phase VII Final Cover construction.
Basis:
UNIT RATES (THIRD PARTY COSTS)

RMU-1 CLOSURE		**2011**		**Basis of Production and Quantities for In-House Estimate**
ANCHOR TRENCHES				
Permanent		acre	$ 1,100	Quoted price from Tri-C
Temporary		acre	$ 4,500	Quoted price from Tri-C
Subtotal		**acre**	**$ 5,600**	
GEOTEXTILE MATERIAL - FINAL COVER		acre	$ 1,220	Quoted price from Tri-C
GEOTEXTILE MATERIAL - BASELINER				
Material Cost		SQFT	$ 0.16	
Installation Cost		SQFT	$ 0.12	
Subtotal		**SQFT**	$ 0.28	
PERIMETER DITCHES AND ROADWAYS				
Perimeter Ditches and Roadways		LF	$ 12	2010 Average of two bids
UNCLASSIFIED FILL				
Load, haul, place, grade and compact general fill:		CY	$ 10.00	Actual Quoted Cost 2011 (Tri-C, Inc.) for placement of general fill ($10/CY)
Purchase/delivery of general fill from off-site source =		CY	$ 11.00	Actual Quoted Cost 2011 (Tri-C, Inc.) for providing of general fill ($11/CY)
Test Fill Pad Construction		each	$ 12,000.00	Actual 2010 costs/site experience
Test Fill Pad QA/QC & Reporting		each	$ 8,000.00	Actual 2010 costs/site experience
TOPSOIL/VEGETATION				
Load, place, grade, topsoil:seed, fertilize and mulch =		CY	$ 11.00	2011 Quoted price from Tri-C
Purchase/delivery of topsoil from off-site source =		CY	$ 15.00	Quoted price from Tri-C
Purchase and Installation of erosion control matting =		SY	$ 12.50	Average of two bids (third bid disqualified due to non-conformity)
Subtotal Topsoil/Vegetation		**CY**	**$ 38.50**	
DRAINAGE				
Provide, install final cover drainage tile system		LF	$ 15.06	Average of two bids (third bid disqualified due to non-conformity)
Provide, install final cover surface water downflume		each	$ 23,625	6,300 SQFT x $3.75/SQFT = $23,625
BASELINER CLAY		CY	$ 18	
DRAINAGE STONE BASELINER - Material delivered		CY	$ 27.53	
SELECT FILL (OPERATIONS STONE) - Material delivered		CY	$ 24.83	

Unit Rates RMU-2
Closure Cost Estimate
CWM Chemical Services, LLC, Model City, New York

2011 Unit Rates are based on actual costs for contractor capping 10.0 acres of RMU-1 during Phase VII Final Cover construction.
Basis:
UNIT RATES (THIRD PARTY COSTS)

			2011		Basis of Production and Quantities for In-House Estimate
RMU-1 CLOSURE			**2011**		**Basis of Production and Quantities for In-House Estimate**
FINAL COVER CQA, SURVEYING AND CQA REPORT		acre	$	25,700	2010 Average of two bids
BASELINER CQA, SURVEYING AND CQA REPORT		acre	$	51,400	
CONSTRUCTION CONTRACTOR MOB/DEMOB/ADMIN/SURVEY =		%		5	
DESIGN SUPPORT					
Pre-Construction Design Costs			$	25,000	$25,000 for 22.8 acres
Engineering During Construction			$	25,000	$25,000 for 22.8 acres
CONSTRUCTION MANAGEMENT		acre	$	4,500	Quoted price Ensol, Inc
GEOSYNTHETICS CONFORMANCE TESTING					
40-Mil Geomembrane (1/100,000)		sample	$	98	Actual Costs 2011 (TRI Environmental)
80-Mil Geomembrane (1/100,000)		sample	$	98	Actual Costs 2011 (TRI Environmental)
Geocomposite (1/100,000)		sample	$	300	Actual Costs 2011 (TRI Environmental)
GCL (1/100,000)		sample	$	235	Actual Costs 2011 (TRI Environmental)
Geotextile (1/100,000)		sample	$	247	Actual Costs 2011 (TRI Environmental)
Final Cover					
Interface Friction Testing (GCL/Soil)		sample	$	5,055	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (GCL/40-Mil)		sample	$	5,055	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (40-Mil/Geocomposite)		sample	$	5,055	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Geocomposite/Soil)		sample	$	5,055	Actual Costs 2011 (TRI Environmental)
Base Liner					
Interface Friction Testing (Base GCL/NW-textile)		sample	$	5,055	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Base GCL/80-Mil)		sample	$	5,055	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Base 80-Mil/Geocomp)		sample	$	5,055	Actual Costs 2011 (TRI Environmental)
Interface Friction Testing (Base Clay/80-Mil)		sample	$	5,055	Actual Costs 2011 (TRI Environmental)
MISCELLANEOUS					
200 GPM Transfer Pump		each		$6,194	2004 DEC Rate * Implicit Deflator
Pump/Motor Replace/Maint/Repair		each		$2,294.00	2004 DEC Rate * Implicit Deflator

Unit Rates RMU-2
Closure Cost Estimate
CWM Chemical Services, LLC, Model City, New York

2011 Unit Rates are based on actual costs for contractor capping 10.0 acres of RMU-1 during Phase VII Final Cover construction.

Basis:

UNIT RATES (THIRD PARTY COSTS)

RMU-1 CLOSURE		**2011**		**Basis of Production and Quantities for In-House Estimate**
SOIL PREQUALIFICATION & CONSTRUCTION TESTING				
Particle Size Dist. w/o hydr.		sample	$ 70	Actual Costs 2011 (TRI Environmental)
Particle Size Dist. w/o hydr.		sample	$ 100	Actual Costs 2011 (TRI Environmental)
Modified Proctor		sample	$ 120	Actual Costs 2011 (TRI Environmental)
Standard Proctor		sample	$ 115	Actual Costs 2011 (TRI Environmental)
Dir. Shear (3 normal stresses/set)		sample	$ 500	Actual Costs 2011 (TRI Environmental)
Atterberg Limits		sample	$ 65	Actual Costs 2011 (TRI Environmental)
Remolded Permeability		sample	$ 198	Actual Costs 2011 (TRI Environmental)
Moisture Content		sample	$ 12	Actual Costs 2011 (TRI Environmental)
Organic Content		sample	$ 55	Actual Costs 2011 (TRI Environmental)
Soil Classification		sample	$ 10	Actual Costs 2011 (TRI Environmental)

Rate Adjustment for inflation:

2011 Rate = 110.654 (2010 GDP) ÷ 96.77 (2004 GDP) = 1.14347421721608	1.147	Adjust 2004 DEC rates to 2011 rates based on implicit deflator

PCC-9.01: RMU-2 (1-Cell)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
RMU-2 Parameters - Area						6.9 acres = 33,396 SY = 300,564 SF = 300.6 MSF	31680 LF (6 Mi.) = total est'd perimeter fencing for eight (8) SLFs
RMU-2 Parameters - Fencing							0 LF = portion of perimeter fencing for RMU-2

Perimeter Ditch	2,290 linear feet	585+585+560+560 = 2,290
Drainage Tile System	2,939 linear feet	6.9 acres * 426 LF/acre = 2,939 LF
MSE Wall	1,665 linear feet	

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.01.1 Annual Visual Inspections						make visual inspections and log results; two persons required	
Post-Closure							
Technician - Landfill	6.8	hours	$38.00	$258	$0	2 hrs/insp x 1.7 insp/year x 2 per crew = 6.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Landfill Leachate Syst	6.8	hours	$38.00	$258	$0	2 hrs/insp x 1.7 insp/year x 2 per crew = 6.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Perimeter Fencing	0	hours	$38.00	$0	$0	3 hrs/insp x 2.0 insp/year x 2 per crew/ 8 facility units = 1.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Storm Water Mgt Syst	7.2	hours	$38.00	$274	$0	2 hrs/insp x 1.8 insp/year x 2 per crew = 7.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - 25-Yr Storm Event	0	hours	$38.00	$0	$0	included above	this activity s/b included with annual storm water inspect'ns
Engineer - MSE Wall Inspection	8	hours	$130.00	$1,040	$0	8 hrs/insp x 1.0 insp/year x 1 per crew = 8.0 hours	
Subtotal - Annual Inspections				**$1,830**	**$0**	RMU-2 post-closure inspections	
Perpetual Care						Perpetual Care Frequencies according to Page 11 of Site-Wide and RMU-2 Post-Closure Plans	
Technician - Landfill	4.0	hours	$38.00	$0	$152	2 hrs/insp x 1.0 insp/year x 2 per crew = 4.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Landfill Leachate Syst	4.0	hours	$38.00	$0	$152	2 hrs/insp x 1.0 insp/year x 2 per crew = 4.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Perimeter Fencing	0.0	hours	$38.00	$0	$0	4 hrs/insp x 1.0 insp/year x 2 per crew/ 8 facility units = 1.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Storm Water Mgt Syst	4.2	hours	$38.00	$0	$160	2 hrs/insp x 1.04 insp/year x 2 per crew = 4.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - 25-Yr Storm Event	0.0	hours	$38.00	$0	$0	included above	this activity s/b included with annual storm water inspect'ns
Engineer - MSE Wall Inspection	8	hours	$130.00	$1,040	$1,040	8 hrs/insp x 1.0 insp/year x 1 per crew = 8.0 hours	
Subtotal - Annual Inspections Perp-Care				**$0**	**$1,504**	RMU-2 perpetual care inspections	
(Subt: Assemb PCC-9.01.1)				**$1,830**	**$1,504**	RMU-2 visual inspections. The Cost for facility fence inspection is already provided in the post closure estimate for 8 other units	
PCC-9.01.2 Perimeter Fence Maint.						one-eighth of total perimeter fencing allocated per SLF unit; 2% annual replacement projected	
Subt - Perimeter Fence Maint.				**$0**	**$0**	*The Cost for facility fence repair is already provided in the post closure estimate for 8 other units*	
(Subt: Assemb PCC-9.01.2)				**$0**	**$0**		
PCC-9.01.3 Maint. Benchmarks/Surv						Annual inspection only	
Maint of Benchmarks & Surveying	0	acres	$0.00	$0	$0	Included in PCC-9.01.1	
Subt - Benchmarks & Surveying				$0	$0		
(Subt: Assemb PCC-9.01.3)				**$0**	**$0**		

PCC-9.01: RMU-2 (1-Cell)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.01.4 Groundwater Monitoring						*sampling crew composed of two technicians; 9 monitoring wells*	
Monit'g Events & Samples/Event						*0.0 quart'ly + 16.0 semi-ann + 1.0 b-ann'l x 1.05 each = 17.3 samp*	*includes 5% QA sampling*
Post-Closure							
Technician	34.6	hours	$38.00	$1,315	$0	17.3 samps @ 1.0 hrs/samp x 2 per crew = 34.6 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	17.3	samp	$25.00	$433	$0	17.3 samps	bottles, shipping supplies
VOCs	17.3	samp	$105.00	$1,817	$0	17.3 samps	Average of three quotes
Subt - GW Monitoring				**$3,564**	**$0**	*post closure groundwater monitoring*	
Monit'g Events & Samples/Event						9 wells @ sample/5 years *1.05 each =* 1.9 samp/yr	
Perpetual Care						Perpetual care groundwater monitoring once every five years	
Technician	3.8	hours	$38.00	$0	$144	1.9 samps @ 1.0 hrs/samp x 2 per crew = 3.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	1.9	samp	$25.00	$0	$48	1.9 samples	bottles, shipping supplies
VOCs	1.9	samp	$105.00	$0	$200	1.9 samples	Average of three quotes
Subt - GW Monitoring				**$0**	**$391**	*perpetual care groundwater monitoring*	
PCC-9.01.5 Outfalls 002,003,004 SPDES Mon						production rate = 2 hours per sample for a one-person crew: each year of monitoring during closure	
Weekly Sampling Events						12 months = 52 weeks @ 3 outfalls @ 1 sample/OF = 156 samples	sampling & analysis according to SPDES Permit
Subt - SPDES Outfall Sampling & Analysis				**$0**	**$0**	*The Cost for facility stormwater discharge is already provided in the post closure estimate for 8 other units*	
PCC-9.01.6 Discharge Monitoring Report						Monthly Discharge Monitoring Reports	
Subt - Discharge Monitoring Report				**$0**	**$0**	submittal of SPDES Permit required Discharge Monitoring Report (DMR)	
						The Cost for facility stormwater discharge is already provided in the post closure estimate for 8 other units	
(Subt: Assemb PCC-9.01.4 thru 9.01.6)				**$3,564**	**$391**	*RMU-2 groundwater & stormwater monitoring activities*	
PCC-9.01.7 Landfill Cover Maint.							
Replacement of Cover	0.0345	acre	$20,973.33	$724	$724	6.9 acre @ 0.5% per year = 0.0345 acres/yr	unit price based upon vegetation, topsoil, from RMU-1,
Subt - Landfill Cover Maint.				**$724**	**$724**	*RMU-2 upper cap maintenance and replacement*	Assemblies 14.17 thru 14.18
PCC-9.01.8 Mowing/Grooming							
Mowing	300.6	MSF	$3.21	$966	$966	300.6 MSF @ 1.0 per year = 300.6 MSF	DEC 2004 rate * deflator (2004-2010)
Fertilizing	60.1	MSF	$3.82	$230	$230	300.6 MSF @ 1.0 per 300.6 MSF 60.1 MSF	DEC 2004 rate * deflator (2004-2010)
Subt - Mowing/Grooming				**$1,195**	**$1,195**	RMU-2 *mowing and fertilizing*	
(Subt: Assemb PCC-9.01.7 thru 9.01.8)				**$1,919**	**$1,919**	*RMU-2 cap maintenance activities: post-closure & perpetual care frequency are equal*	
PCC-9.01.9 MSE Wall Maint.						$3.03 based on 6,600 LF for 6-cell scenario.	
MSE Wall Maint.	1665	LF	$3.03	$5,045	$5,045	1,665 LF of MSE wall	WM/Golder Guidance Document (12-1-10)
Subt - MSE Wall Maint.				**$5,045**	**$5,045**	*RMU-2 MSE Wall maintenance*	
(Subt: Assemb PCC-9.01.9)				**$5,045**	**$5,045**		

PCC-9.01: RMU-2 (1-Cell)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.01.10 Leachate System Mgmt						operation time = 8 hours/day x 5 days/week x 50 weeks/year = 2,000 hours	
Leachate Treatment	26049	gal	$0.0178	$464	$0	26,049 gals estimated annual leachate volume based average prediction 0-30 years post closure	unit price derived from AWTS O&M model
Leachate Treatment - Perpetual Care	5172	gal	$0.0178	$0	$92	5,172 gallons perpetual care average years 31-60 Taken from RMU-2 2012 LeachGenMode	
Leach Treat Syst. Capital Repl Cost	0	LS	$17,642.00	$0	$0	$3,087 K div by 25 year life = $123,495/yr div by 7 facility units = $17,642 each (costs allocated to other 7 units at	DEC estimate of AWTS capital replacement costs @ 25 yrs
						The Cost for capital replacement of AWTS is already provided in the post closure estimate for 7 other units that generate leachate	
Laborer	12	hours	$39.00	$468	$468	1 hrs/mon x 12 mon/year = 12 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician	12	hours	$38.00	$456	$456	1 hrs/mon x 12 mon/year = 12 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Primary Leachate VOC Samp & Analysis	2.1	sample	$105.00	$221	$221	1 sump x 1.05 per sump x 2.0 event/yr = 2.1 samples	Avg. of three lab quotes
Primary Leachate Metals Samp & Analysis	2.1	sample	$188.00	$395	$395	1 sump x 1.05 per sump x 2.0 event/yr = 2.1 samples	Avg. of three lab quotes
Primary Leachate PCBs Samp & Anaylsis	2.1	sample	$133.33	$280	$280	1 sump x 1.05 per sump x 2.0 event/yr = 2.1 samples	Avg. of three lab quotes
Secondary Leachate VOC Samp & Analysis	2.1	sample	$105.00	$221	$221	1 sump x 1.05 per sump x 2.0 event/yr = 2.1 samples	Avg. of three lab quotes
Secondary Leachate Metals Samp & Analysis	1.1	sample	$188.00	$207	$207	1 sump x 1.05 per sump = 1.0 event/yr = 1.1 samples	Avg. of three lab quotes
Secondary Leachate PP Organics Samp & Analysis	1.1	sample	$633.33	$697	$697	1 sump x 1.05 per sump = 1.0 event/yr = 1.1 samples	Avg. of three lab quotes
Electrical Costs - Pumps	384.6	KWH	$0.086	$33	$33	343.7 hr/yr x 1.5 hp/hr x 0.746 kw/hp = 384.6 KWH	2004 DEC Rate * Implicit Deflator
Replacement of Main Pump T-150	0.2	pump	$14,425.00	$2,885	$2,885	1 pump per 5 years = 0.2 pumps	30 hp pump, site experience
Replacement of Secondary Pump T-150	0.0	pump	$14,425.00	$0	$0	1 pump per 5 years = 0.2 pumps	Pump not necessary in post closure
Replace Primary Sump Pumps	0.2	pump	$1,382.00	$276	$276	1 pumps x 20.0% pu/yr = 0.2 pumps	1.5 hp submersible pump, site experience
Replace Secondary Sump Pumps	0.15	pump	$850.00	$128	$128	1 pumps x 15.0% pu/yr = 0.15 pumps	4" subm pump, 0.5 hp, , site experience
Replacement of Pump Dischg Hose	0.35	hose	$211.54	$74	$74	0.35 pumps x 1 per pump = 0.35	DEC 2004 rate * deflator (2004-2010)
Disposal of Pumps/Hoses	3.5	CF	$12.45	$44	$44	0.35 pu/hos @ 10 CF/pump = 3.5 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Replacement of Piping - 2"/4"	0.8	LF	$53.25	$43	$43	160 LF @ 0.5% per year = 0.8 LF/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Piping - 2"/4"	0.26	CF	$12.45	$3	$3	0.8 LF @ 0.33 CF/LF = 0.26 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Replace Piping - 4"/8" & 6"/10"	5.24	LF	$73.50	$385	$385	1047 LF @ 0.5% per year = 5.24 LF/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Piping - 4"/8" & 6"/10"	2.62	CF	$12.45	$33	$33	5.24 LF @ 0.50 LF/drum = 2.62 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Pipe Cleaning - 8" diameter	700.8	LF	$2.14	$1,500	$1,500	700.8 LF @ 1.0 events/yr = 700.8 LF	DEC 2004 rate * deflator (2004-2010)
Subt - Leachate Coll Syst Mgmt				**$8,810**	**$8,438**	*annual O&M costs plus capital replacement of treatment system, pumps, and piping*	
PCC-9.01.11 AWTS Operation						Shift operation of the AWTS for 12 months	no DEC estimate for this activity: DEC Estimate included in unit rate
Subt - AWTS Operation				**$0**	**$0**	AWTS Operation - operation of AWTS for twelve (12) months during post closure or perpetual care of the site	
						The Cost for operation of AWTS is already provided in the post closure estimate for 7 other units that generate leachate	
PCC-9.01.12 Site Waters Treatment							
Subt - Site Waters Treatment				**$0**	**$0**	*The Cost for treatment of of site waters is already provided in the post closure estimate for 7 other units*	Labor included in PCC-1.7a
PCC-9.01.13 Batch Tank Qualification						2 Batch Qualification tanks prior to discharge to facultative ponds	To Meet LDR requirements
Subt - Batch Tank Qualification				**$0**	**$0**	*The Cost for tank qualifications is already provided in the post closure estimate for 7 other units*	Samples collected by lab technician
PCC-9.01.14 Pond Sampling & Analysis (Outfall 001)						production rate = 2.0 hours per composite sample for a three-person crew	SPDES PreQual Sampling of Outfall 001 prior to discharge
Batch Sampling Events						*1 events @ 3 samp/evnt= 3 samples*	sampling & analysis prior to pond discharge
Subt - Pond Sampling & Analysis				**$0**	**$0**	*The Cost for pond qualifications is already provided in the post closure estimate for 7 other units*	

PCC-9.01: RMU-2 (1-Cell)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.01.15 Pond S&A Certification & Report						one event per year for divers to check discharge pipe; one predischarge qualification report	
Subt - S&A Cert'n & Report				$0	$0	*diver(s) to check discharge pipe; also engineer's predischarge qualification report*	
						The Cost for pond qualifications report and diver inspections of outfall is already provided in the post closure estimate for 7 other units	
PCC-9.01.16 Empty (Pump) FAC Pond to Outfall 001						prod'n rate = 960,000 gals/day = 60,000 gals/hr = 1,000 gals/min per facility est @ 16 hrs/day O&M	Treated wastewater from all 7 units
FAC Pond 1/2 Inventory in Gallons		*gals*	*n/a*			45.8 *total hours req'd to pump*	& site waters
Subtotal - Pump FAC Pond 1/2				$0	$0	*transfer contents of FAC Pond to discharge pipe to Niagara River* (3,000 ft). The Cost for discharge to outfall is already provided in the post closure estimate for 7 other units	
(Subt: Assemb PCC-9.01.10 thru 9.01.16)				**$8,810**	**$8,438**	RMU-2 *share of annual O&M and capital costs for leachate collection & treatment: provided in post closure cost estimate for 7 other units at facility*	
PCC-9.01.17 N/A							
Subt - N/A				$0	$0		
PCC-9.01.18 N/A							
Subt - N/A				$0	$0		
PCC-9.01.19 N/A							
Subt - N/A				$0	$0		
(Subt: Assemb PCC-9.01.17 thru 9.01.19)				$0	$0	RMU-2 share of annual leachate transport costs - n/a, as leachate pumped directly to the AWTS	
PCC-9.01.20 Tank Assessments						sixteen (16) tanks requiring internal & external inspections once every five years by 1 PE + 2 Techs	
Internal & External Inspections						*16 tanks @ 5 yr inspect = 3.2 tnks/yr @ 7 areas = 0.5 tnks/yr*	
Subt - Tank Assessments				$0	$0	*inspection of 16 tanks*	
						The Cost for tank assessment is already provided in the post closure estimate for 7 other units	
PCC-9.01.21 Tank Assessments						thirty (32) tanks requiring only external inspections once every five years by 1 PE	
External Only Inspections						*30 tanks @ 5 yr inspect = 6.0 tnks/yr @ 7 areas = 0.9 tnks/yr*	
Subt - Tank Assessments				$0	$0	*inspection of 32 tanks*	
						The Cost for tank assessment is already provided in the post closure estimate for 7 other units	
(Subt: Assemb PCC-9.01.20 thru 9.01.21)				$0	$0	RMU-2 *share of annual tank assessment costs: post-closure & perpetual care frequency are equal*	
PCC-9.01.22 Replace Mon Well Pump							
Replace Mon Well Pumps	0.23	pump	$900.00	$207	$207	9 pumps @ 2.5% per year = 0.23 pumps/yr	Site experience third party costs
Technician	2.0	Hour	$38.00	$76	$76	2 hours per year	third party labor costs
Disposal of Pumps	0.23	CF	$12.45	$3	$3	0.23 pumps @ 1.0 CF/pump = 0.23 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Repair Mon Well Concrete Pads	0.23	pad	$131.50	$30	$30	9 pads @ 2.5% per year = 0.23 pads/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Well Surface Concrete	0.46	CF	$12.45	$6	$6	0.23 pads @ 2.0 CF/pad = 0.46 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Repair Mon Well Covers	0.23	each	$371.63	$85	$85	9 covers @ 2.5% per year = 0.23 covers/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Mon Well Covers	0.12	CF	$12.45	$1	$1	0.23 covers @ 0.5 CF/cover = 0.12 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Subt - Replace Mon Well Pumps				**$409**	**$409**	*monitoring well pump maintenance and replacement*	
(Subt: Assemb PCC-9.01.22)				**$409**	**$409**	*RMU-2 mon well pump maintenance & replacement: post-closure & perpetual care frequency are equal*	

PCC-9.01: RMU-2 (1-Cell)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.01.23 Drainage Ditch Repair						ditches estimated to be 10 feet in width	
RMU-2 Drainage Ditches						Perimeter Ditch + Drainage Tile System = 2,290 + 2,939 = 5,229 LF	drainage ditches specific to RMU-2 unit
Facility-wide Drainage Ditches						*22600 LF div by 8 units = 2825 LF* 0 LF for RMU-2	*drainage ditches in non-specific areas of facility*
RMU-2 Downchutes						*685 LF 26" pipe 266 LF 6" pipe*	
Drainage Ditch Repair	0.012	acre	$5,698.00	$68	$68	5,229 LF x 10 ft/LF = 1.2. acres @ 1.0% per year = 0.012 acres	unit price based upon $5,698/acre (RMU-1 Assembly 14.20)
Downchute Pipe Cleaning 26"	34.25	LF	$2.14	$73	$73	685 LF x 5.0% per year = 34.25 LF	DEC 2004 rate * deflator (2004-2010) for cleaning 8" dia pipe
Downchute Pipe Cleaning 6"	13.3	LF	$2.14	$28	$28	266 LF x 5.0% per year = 13.3 LF	DEC 2004 rate * deflator (2004-2010) for cleaning 8" dia pipe
Subt - Drainage Ditch Repair				**$170**	**$170**	*stormwater drainage ditch repair*	
						The cost of repair of facility-wide ditches is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.01.24 Drainage Ditch Cleaning						ditches estimated to be 10 feet wide; sediment estimated to be 4 inches deep.	
RMU-2 *Drainage Ditches*						5,229 LF	drainage ditches specific to RMU-2 unit
Facility-wide Drainage Ditches						*22600 LF div by 8 units = 2825 LF* 0 LF for RMU-2	*drainage ditches in non-specific areas of facility*
Drainage Ditch Sediment Cleaning	6.45	CY	$2.38	$15	$15	5,229 LF x 10.0 ft/LF x 0.333 feet (4")/27 = 645.5 CY @ 1%/yr = 6.45 CY	unit price based upon FAC Ponds 1/2 excavation (6.11)
Transportation of Ditch Sediment	2.2	miles	$3.25	$7	$7	8.7 tons @ 20 tons/load = 0.435 loads @ 5 miles per load = 2.2 miles	unit price based upon FAC Ponds 1/2 transportation (6.13)
Disposal of Ditch Sediment	8.7	ton	$35.00	$305	$305	6.45 CY @ 1.35 ton/CY = 8.7 tons	unit price based upon FAC Ponds 1/2 disposal (6.14)
Subt - Drainage Ditch Cleaning				**$327**	**$327**	*stormwater drainage ditch cleaning*	
						The cost of cleaning of facility-wide ditches is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.01.25 Basin Cleaning						sediment estimated to be 4 inches deep.	
Basin No. 1						*140625 SF div by 8 units = 17578 SF*	
Basin No. 2						*150000 SF div by 8 units = 18750 SF*	
Subt--Basin Cleaning				**$0**	**$0**	*facility stormwater basin cleaning*	
						The cost of cleaning of facility basins is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.01.26 Culvert Maint/Replace						average culvert = 40 feet in length and 18 inches in diameter; replace one 40-foot sections/year	
RMU-2 *Culverts*						*1 culverts x 40 feet long = 40 LF*	culverts specific to RMU-2 unit
Facility-wide Culverts						*20 culverts x 40 feet long = 800 LF div by 8 units =* 0 LF for RMU-2	*culverts in non-specific areas of facility*
Culvert Cleaning - 18" diameter avg	40	LF	$2.14	$86	$86	40 LF	DEC 2004 rate * deflator (2004-2010)
Repl Culvert - 18" diam avg (RMU-2)	40	LF	$11.61	$464	$464	40.0 LF @ 1 culvert/yr = 40 LF	DEC 2004 rate * deflator (2004-2010)
Repl Culv't - 18" diam avg (sitewide)	0	LF	$22.35	$0	$0	40.0 LF @ 1.00 culvert/yr = 40 LF 0 LF for RMU-2	DEC 2004 rate * deflator (2004-2010)
Replace Culvert - Ditch Excavation	30	CY	$2.96	$89	$89	40.0 LF x 0.75 CY/LF = 30 CY	DEC 2004 rate * deflator (2004-2010)
Replace Culvert - Bkfill/Compaction	30	CY	$3.86	$116	$116	30 CY	DEC 2004 rate * deflator (2004-2010)
Subt - Culvert Maint/Replacement				**$755**	**$755**	*culvert maintenance and replacement*	
						The cost of cleaning of maintaining facility-wide drainage is provided in post-closure estimate for 8 other units at the facility.	
(Subt: Assemb PCC-9.01.23 thru 9.01.26)				**$1,252**	**$1,252**	RMU-2 *storm drainage maintenance & replacement: post-closure & perpetual care frequency are equal*	

PCC-9.01: RMU-2 (1-Cell)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.01.27 Road Maint/Replace						gravel roads = 15 feet wide; asphalt roads = 20 feet wide	
RMU-2 *Gravel Roads*						*2290 LF x 15 feet wide/ 9 SF/SY = 3,817 SY @ 2% per year = 76.3 SY*	
Facility-wide Asphalt Roads						*21120 LF x 20 feet wide = 422400 SF @ 1% per year =* 0 SF for RMU-2	*asphalt roads in non-specific areas of facility*
RMU-2 Gravel Road Repair	76.3	SY	$3.12	$238	$238	16.5 SY	DEC 2004 rate * deflator (2004-2010)
Facility-wide Asphalt Roads	0	SF	$1.35	$0	$0	4,224.0 SF div by 8 units = 528.0 SF 0 SF for RMU-2	DEC 2004 rate * deflator (2004-2010)
Subt - Road Maint/Replacement				**$238**	**$238**	*road maintenance and replacement*	
						The cost of cleaning of maintaining facility-wide roads is provided in post-closure estimate for 8 other units at the facility.	
(Subt: Assemb PCC-9.01.27)				**$238**	**$238**	*RMU-2 road maintenance & replacement*	

Total Non-Super hours 89.4

PCC-9.01.28 PPE Use/H&S Planning						Level C @ 10%; Mod Level C @ 15%; Level D @ 75% for tot non-supv hrs for all tasks; HASP @ 2.5% of non-supv hrs	
PPE Usage - Level D	8.4	days	$0.00	$0	$0	89.4 hours @ 8 hr/day = 11.2 days @ 75% "D" days = 8.4 days	75% of non-supv hrs in Level D (used facility price: $0/day)
PPE Usage - Mod Level C	1.7	days	$9.00	$15	$15	89.4 hours @ 8 hr/day = 11.2 days @ 15% "C" days = 1.7 days	15% of non-supv hrs in Mod Level C (used facility price: $9/day)
PPE Usage - Level C	1.1	days	$25.00	$28	$28	89.4 hours @ 8 hr/day = 11.2 days @ 10% "C" days = 1.1 days	10% of non-supv hrs in Level C (used facility price: $25/day)
Health & Safety Officer	2.2	hours	$75.00	$165	$165	89.4 hours @ 2.5% hr/hr = 2.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Subt - PPE Usage/H&S Planning				**$208**	**$208**		
PCC-9.01.29 Supervision							
Foreman	0	hours	$65.00	$0	$0	Included in Post-Closure cost estimates for other 7-units at the facility that generate leachate	loaded labor rate: loaded labor rate 2011 3rd party quote
Site Project Manager	0	hours	$75.00	$0	$0	Included in Gen'l Contractor G&A/Home Office indirect costs	loaded labor rate: loaded labor rate 2011 3rd party quote
Subtotal - Supervision				**$0**	**$0**		
(Subt: Assemb PCC-9.01.28 thru 9.01.29)				**$208**	**$208**	supervision, health & safety, and certification	

PCC 9.01 (1-Cell): RMU-2 Direct Cost				**$23,274**	**$19,404**

PCC-9.01: RMU-2 (1-Cell)

Total Cost Summary

Cost Category	**Proposed Percent of Direct Cost**	**Proposed Annual Cost Post - Closure Period**	**Proposed Cost - Annual Perpetual Care**	**Cost Range**
Direct Costs		$23,274	$19,404	
Plus Indirect Costs/Profit:				
Site Activity Management Costs	3.00%	$698	$582.11	Included in Gen'l Contractor G&A/Home Office (note: DEC uses 3%)
Gen'l Contractor G&A/Home Office	4.00%	$931	$776	5% for post-closure. (note: DEC uses 4%)
Pre-Construction Design Costs	1.00%	$233	$194.04	For post-closure, design costs minimal and included in Assb 6.21. (note: DEC uses 1%)
Engineering During Construction	1.00%	$233	$194.04	For post-closure, design costs minimal and included in Assb 6.21. (note: DEC uses 1%)
General Contractor Profit	6.00%	$1,396	$1,164	Contractor Profit included in unit rates & Gen' Cont G&A/Home Office (Note DEC adds 6%)
Indirect Costs & Profit	15.00%	$3,491	$2,911	
Subtotal - Direct/Indirect Costs		$26,766	$22,314	
Plus Contingency	15.00%	$4,015	$3,347	DEC uses 15% applied to total cost
Total - PCC-9.01: RMU-2 (1-Cell)		**$30,781**	**$25,661**	

RMU-2 Years of Post Closure | Years Since Closure N/A | Post Closure Years Remaining 30

Post Closure Costs Remaining Years		**$923,415**
Post Closure Costs 30-Years		**$923,415**

Liner Feet of MSE Wall		Cell #	Acres	Cummulative Acres
1-Cell Scenario (Cell 20)	1665	20	6.9	6.9
2-Cell Scenario (Cells 18,20)	2095	18	6.2	13.1
3-Cell Scenario (Cells 18,20,19)	3815	19	6.4	19.5
4-Cell Scenario (Cells 18,20,19,17)	4200	17	5.9	25.4
5-Cell Scenario (Cells 18,20,19,17,16)	5230	16	6.5	31.9
6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A	15	6.6	38.5
		Total Area	38.5	acres

Includes slope correction

PCC-9.02: RMU-2 (2-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
RMU-2 Parameters - Area						13.1 acres = 6,404 SY = 570,636 SF = 570.6 MSF	31680 LF (6 Mi.) = total est'd perimeter fencing for eight (8) SLFs
RMU-2 Parameters - Fencing							0 LF = portion of perimeter fencing for RMU-2
Perimeter Ditch	3,700 linear feet			(710+560)+585+560+300+710+275 = 3,700			
Drainage Tile System	5,580 linear feet			13.1 acres * 426 LF/acre = 5,580 LF			
MSE Wall	2095 linear feet						

PCC-9.02.1 Annual Visual Inspections						make visual inspections and log results; two persons required	
Post-Closure							
Technician - Landfill	6.8	hours	$38.00	$258	$0	2 hrs/insp x 1.7 insp/year x 2 per crew = 6.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Landfill Leachate Syst	6.8	hours	$38.00	$258	$0	2 hrs/insp x 1.7 insp/year x 2 per crew = 6.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Perimeter Fencing	0	hours	$38.00	$0	$0	3 hrs/insp x 2.0 insp/year x 2 per crew/ 8 facility units = 1.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Storm Water Mgt Syst	7.2	hours	$38.00	$274	$0	2 hrs/insp x 1.8 insp/year x 2 per crew = 7.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - 25-Yr Storm Event	0	hours	$38.00	$0	$0	included above	this activity s/b included with annual storm water inspect'ns
Engineer - MSE Wall Inspection	10	hours	$130.00	$1,300	$0	10 hrs/insp x 1.0 insp/year x 1 per crew = 10.0 hours	
Subtotal - Annual Inspections				**$2,090**	**$0**	RMU-2 post-closure inspections	
Perpetual Care						Perpetual Care Frequencies according to Page 11 of Site-Wide and RMU-2 Post-Closure Plans	
Technician - Landfill	4.0	hours	$38.00	$0	$152	2 hrs/insp x 1.0 insp/year x 2 per crew = 4.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Landfill Leachate Syst	4.0	hours	$38.00	$0	$152	2 hrs/insp x 1.0 insp/year x 2 per crew = 4.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Perimeter Fencing	0.0	hours	$38.00	$0	$0	4 hrs/insp x 1.0 insp/year x 2 per crew/ 8 facility units = 1.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Storm Water Mgt Syst	4.2	hours	$38.00	$0	$160	2 hrs/insp x 1.04 insp/year x 2 per crew = 4.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - 25-Yr Storm Event	0.0	hours	$38.00	$0	$0	included above	this activity s/b included with annual storm water inspect'ns
Engineer - MSE Wall Inspection	10	hours	$130.00	$0	$1,300	10 hrs/insp x 1.0 insp/year x 1 per crew = 10.0 hours	
Subtotal - Annual Inspections Perp-Care				**$0**	**$1,764**	RMU-2 perpetual care inspections	
(Subt: Assemb PCC-9.02.1)				**$2,090**	**$1,764**	RMU-2 visual inspections. The Cost for facility fence inspection is already provided in the post closure estimate for 8 other units	

PCC-9.02.2 Perimeter Fence Maint.						one-eighth of total perimeter fencing allocated per SLF unit; 2% annual replacement projected	
Subt - Perimeter Fence Maint.				**$0**	**$0**	*The Cost for facility fence repair is already provided in the post closure estimate for 8 other units*	
(Subt: Assemb PCC-9.02.2)				**$0**	**$0**		

PCC-9.02.3 Maint. Benchmarks/Surv						Annual inspection only	
Maint of Benchmarks & Surveying	0	acres	$0.00	$0	$0	Included in PCC-9.02.1	
Subt - Benchmarks & Surveying				$0	$0		
(Subt: Assemb PCC-9.02.3)				**$0**	**$0**		

PCC-9.02: RMU-2 (2-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.02.4 Groundwater Monitoring						*sampling crew composed of two technicians; 21 monitoring wells*	
Monit'g Events & Samples/Event						*0.0 quart'ly + 40 semi-ann + 1.0 b-ann'l x 1.05 each = 42.5 samp*	*includes 5% QA sampling*
Post-Closure							
Technician	85	hours	$38.00	$3,230	$0	42.5 samps @ 1.0 hrs/samp x 2 per crew = 85 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	42.5	samp	$25.00	$1,063	$0	42.5 samps	bottles, shipping supplies
VOCs	42.5	samp	$105.00	$4,463	$0	42.5 samps	Average of three quotes
Subt - GW Monitoring				**$8,755**	**$0**	*post closure groundwater monitoring*	
Monit'g Events & Samples/Event						21 wells @ sample/5 years *1.05 each =* 4.4 samp/yr	
Perpetual Care						Perpetual care groundwater monitoring once every five years	
Technician	8.8	hours	$38.00	$0	$334	4.4 samps @ 1.0 hrs/samp x 2 per crew = 8.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	4.4	samp	$25.00	$0	$110	4.4 samples	bottles, shipping supplies
VOCs	4.4	samp	$105.00	$0	$462	4.4 samples	Average of three quotes
Subt - GW Monitoring				**$0**	**$906**	*perpetual care groundwater monitoring*	
PCC-9.02.5 Outfalls 002,003,004 SPDES Mon						production rate = 2 hours per sample for a one-person crew: each year of monitoring during closure	
Weekly Sampling Events						12 months = 52 weeks @ 3 outfalls @ 1 sample/OF = 156 samples	sampling & analysis according to SPDES Permit
Subt - SPDES Outfall Sampling & Analysis				**$0**	**$0**	*The Cost for facility stormwater discharge is already provided in the post closure estimate for 8 other units*	
PCC-9.02.6 Discharge Monitoring Report						Monthly Discharge Monitoring Reports	
Subt - Discharge Monitoring Report				**$0**	**$0**	submittal of SPDES Permit required Discharge Monitoring Report (DMR)	
						The Cost for facility stormwater discharge is already provided in the post closure estimate for 8 other units	
(Subt: Assemb PCC-9.02.4 thru 9.02.6)				**$8,755**	**$906**	*RMU-2 groundwater & stormwater monitoring activities*	

PCC-9.02.7 Landfill Cover Maint.							
Replacement of Cover	0.0655	acre	$20,973.33	$1,374	$1,374	13.1 acre @ 0.5% per year = 0.0655 acres/yr	unit price based upon vegetation, topsoil, from RMU-1,
Subt - Landfill Cover Maint.				**$1,374**	**$1,374**	*RMU-2 upper cap maintenance and replacement*	Assemblies 14.17 thru 14.18
PCC-9.02.8 Mowing/Grooming							
Mowing	570.6	MSF	$3.21	$1,833	$1,833	570.6 MSF @ 1.0 per year = 570.6 MSF	DEC 2004 rate * deflator (2004-2010)
Fertilizing	114.1	MSF	$3.82	$436	$436	570.6 MSF @ 1.0 per 5.0 years = 114.1 MSF	DEC 2004 rate * deflator (2004-2010)
Subt - Mowing/Grooming				**$2,269**	**$2,269**	RMU-2 *mowing and fertilizing*	
(Subt: Assemb PCC-9.02.7 thru 9.02.8)				**$3,643**	**$3,643**	*RMU-2 cap maintenance activities: post-closure & perpetual care frequency are equal*	

PCC-9.02.9 MSE Wall Maint.						$3.03 based on 6,600 LF for 6-cell scenario.	
MSE Wall Maint.	2095	LF	$3.03	$6,348	$6,348	2,095 LF of MSE wall	WM/Golder Guidance Document (12-1-10)
Subt - MSE Wall Maint.				**$6,348**	**$6,348**	*RMU-2 MSE Wall maintenance*	
(Subt: Assemb PCC-9.02.9)				**$6,348**	**$6,348**		

PCC-9.02: RMU-2 (2-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.02.10 Leachate System Mgmt						operation time = 8 hours/day x 5 days/week x 50 weeks/year = 2,000 hours	
Leachate Treatment	49454	gal	$0.0178	$880	$0	49,454 gals estimated annual leachate volume based average prediction 0-30 years post closure	unit price derived from AWTS O&M model
Leachate Treatment - Perpetual Care	9819	gal	$0.0178	$0	$175	9,819 gals perpetual care average years 31-60 Taken from RMU-2 2012 LeachGenMode	
Leach Treat Syst. Capital Repl Cost	0	LS	$17,642.00	$0	$0	$3,087 K div by 25 year life = $123,495/yr div by 7 facility units = $17,642 each (costs allocated to other 7 units at tl	DEC estimate of AWTS capital replacement costs @ 25 yrs
						The Cost for capital replacement of AWTS is already provided in the post closure estimate for 7 other units that generate leachate	
Laborer	12	hours	$39.00	$468	$468	1 hrs/mon x 12 mon/year = 12 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician	12	hours	$38.00	$456	$456	1 hrs/mon x 12 mon/year = 12 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Primary Leachate VOC Samp & Analysis	4.2	sample	$105.00	$441	$441	2 sumps x 1.05 per sump x 2.0 event/yr = 4.2 samples	Avg. of three lab quotes
Primary Leachate Metals Samp & Analysis	4.2	sample	$188.00	$790	$790	2 sumps x 1.05 per sump x 2.0 event/yr = 4.2 samples	Avg. of three lab quotes
Primary Leachate PCBs Samp & Anaylsis	4.2	sample	$133.33	$560	$560	2 sumps x 1.05 per sump x 2.0 event/yr = 4.2 samples	Avg. of three lab quotes
Secondary Leachate VOC Samp & Analysis	4.2	sample	$105.00	$441	$441	2 sumps x 1.05 per sump x 2.0 event/yr = 4.2 samples	Avg. of three lab quotes
Secondary Leachate Metals Samp & Analysis	2.1	sample	$188.00	$395	$395	2 sumps x 1.05 per sump = 1.0 event/yr = 2.1 samples	Avg. of three lab quotes
Secondary Leachate PP Organics Samp & Analysis	2.1	sample	$633.33	$1,330	$1,330	2 sumps x 1.05 per sump = 1.0 event/yr = 2.1 samples	Avg. of three lab quotes
Electrical Costs - Pumps	384.6	KWH	$0.086	$33	$33	343.7 hr/yr x 1.5 hp/hr x 0.746 kw/hp = 384.6 KWH	2004 DEC Rate * Implicit Deflator
Replacement of Main Pump T-150	0.2	pump	$14,425.00	$2,885	$2,885	1 pump per 5 years = 0.2 pumps	30 hp pump, site experience
Replacement of Secondary Pump T-150	0.0	pump	$14,425.00	$0	$0	1 pump per 5 years = 0.2 pumps	Pump not necessary in post closure
Replace Primary Sump Pumps	0.4	pump	$1,382.00	$553	$553	2 pumps x 20.0% pu/yr = 0.4 pumps	1.5 hp submersible pump, site experience
Replace Secondary Sump Pumps	0.3	pump	$850.00	$255	$255	2 pumps x 15.0% pu/yr = 0.3 pumps	4" subm pump, 0.5 hp, , site experience
Replacement of Pump Dischg Hose	0.7	hose	$211.54	$148	$148	0.7 pumps x 1 per pump = 0.7	DEC 2004 rate * deflator (2004-2010)
Disposal of Pumps/Hoses	7	CF	$12.45	$87	$87	0.7 pu/hos @ 10 CF/pump = 7 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Replacement of Piping - 2"/4"	1.6	LF	$53.25	$85	$85	320 LF @ 0.5% per year = 1.6 LF/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Piping - 2"/4"	0.53	CF	$12.45	$7	$7	1.6 LF @ 0.33 CF/LF = 0.53 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Replace Piping - 4"/8" & 6"/10"	10.5	LF	$73.50	$772	$772	2,094 LF @ 0.5% per year = 10.5 LF/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Piping - 4"/8" & 6"/10"	5.3	CF	$12.45	$66	$66	10.5 LF @ 0.50 LF/drum = 5.3 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Pipe Cleaning - 8" diameter	1402	LF	$2.14	$3,000	$3,000	1,402 LF @ 1.0 events/yr = 1,402 LF	DEC 2004 rate * deflator (2004-2010)
Subt - Leachate Coll Syst Mgmt				**$13,652**	**$12,946**	*annual O&M costs plus capital replacement of treatment system, pumps, and piping*	
PCC-9.02.11 AWTS Operation						Shift operation of the AWTS for 12 months	no DEC estimate for this activity: DEC Estimate included in unit rate
Subt - AWTS Operation				**$0**	**$0**	AWTS Operation - operation of AWTS for twelve (12) months during post closure or perpetual care of the site	
						The Cost for operation of AWTS is already provided in the post closure estimate for 7 other units that generate leachate	
PCC-9.02.12 Site Waters Treatment							
Subt - Site Waters Treatment				**$0**	**$0**	*The Cost for treatment of of site waters is already provided in the post closure estimate for 7 other units*	Labor included in PCC-1.7a
PCC-9.02.13 Batch Tank Qualification						2 Batch Qualification tanks prior to discharge to facultative ponds	To Meet LDR requirements
Subt - Batch Tank Qualification				**$0**	**$0**	*The Cost for tank qualifications is already provided in the post closure estimate for 7 other units*	Samples collected by lab technician
PCC-9.02.14 Pond Sampling & Analysis (Outfall 001)						production rate = 2.0 hours per composite sample for a three-person crew	SPDES PreQual Sampling of Outfall 001 prior to discharge
Batch Sampling Events						*1 events @ 3 samp/evnt= 3 samples*	sampling & analysis prior to pond discharge
Subt - Pond Sampling & Analysis				**$0**	**$0**	*The Cost for pond qualifications is already provided in the post closure estimate for 7 other units*	

PCC-9.02: RMU-2 (2-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.02.15 Pond S&A Certification & Report						one event per year for divers to check discharge pipe; one predischarge qualification report	
Subt - S&A Cert'n & Report				$0	$0	*diver(s) to check discharge pipe; also engineer's predischarge qualification report*	
						The Cost for pond qualifications report and diver inspections of outfall is already provided in the post closure estimate for 7 other units	
PCC-9.02.16 Empty (Pump) FAC Pond to Outfall 001						prod'n rate = 960,000 gals/day = 60,000 gals/hr = 1,000 gals/min per facility est @ 16 hrs/day O&M	Treated wastewater from all 7 units
FAC Pond 1/2 Inventory in Gallons		*gals*	*n/a*			*45.8 total hours req'd to pump*	& site waters
Subtotal - Pump FAC Pond 1/2				$0	$0	*transfer contents of FAC Pond to discharge pipe to Niagara River* (3,000 ft). The Cost for discharge to outfall is already provided in the post closure estimate for 7 other units	
(Subt: Assemb PCC-9.02.10 thru 9.02.16)				**$13,652**	**$12,946**	RMU-2 *share of annual O&M and capital costs for leachate collection & treatment: provided in post closure cost estimate for 7 other units at facility*	
PCC-9.02.17 N/A							
Subt - N/A				$0	$0		
PCC-9.02.18 N/A							
Subt - N/A				$0	$0		
PCC-9.02.19 N/A							
Subt - N/A				$0	$0		
(Subt: Assemb PCC-9.02.17 thru 9.02.19)				$0	$0	RMU-2 share of annual leachate transport costs - n/a, as leachate pumped directly to the AWTS	
PCC-9.02.20 Tank Assessments						sixteen (16) tanks requiring internal & external inspections once every five years by 1 PE + 2 Techs	
Internal & External Inspections						*16 tanks @ 5 yr inspect = 3.2 tnks/yr @ 7 areas = 0.5 tnks/yr*	
Subt - Tank Assessments				$0	$0	*inspection of 16 tanks*	
						The Cost for tank assessment is already provided in the post closure estimate for 7 other units	
PCC-9.02.21 Tank Assessments						thirty (32) tanks requiring only external inspections once every five years by 1 PE	
External Only Inspections						*30 tanks @ 5 yr inspect = 6.0 tnks/yr @ 7 areas = 0.9 tnks/yr*	
Subt - Tank Assessments				$0	$0	*inspection of 32 tanks*	
						The Cost for tank assessment is already provided in the post closure estimate for 7 other units	
(Subt: Assemb PCC-9.02.20 thru 9.02.21)				$0	$0	RMU-2 *share of annual tank assessment costs: post-closure & perpetual care frequency are equal*	
PCC-9.02.22 Replace Mon Well Pump							
Replace Mon Well Pumps	0.53	pump	$900.00	$477	$477	21 pumps @ 2.5% per year = 0.53 pumps/yr	Site experience third party costs
Technician	2.0	Hour	$38.00	$76	$76	2 hours per year	third party labor costs
Disposal of Pumps	0.53	CF	$12.45	$7	$7	0.53 pumps @ 1.0 CF/pump = 0.53 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Repair Mon Well Concrete Pads	0.53	pad	$131.50	$70	$70	21 pads @ 2.5% per year = 0.53 pads/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Well Surface Concrete	1.1	CF	$12.45	$14	$14	0.53 pads @ 2.0 CF/pad = 1.1 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Repair Mon Well Covers	0.53	each	$371.63	$197	$197	21 covers @ 2.5% per year = 0.53 covers/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Mon Well Covers	0.27	CF	$12.45	$3	$3	0.53 covers @ 0.5 CF/cover = 0.27 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Subt - Replace Mon Well Pumps				**$843**	**$843**	*monitoring well pump maintenance and replacement*	
(Subt: Assemb PCC-9.02.22)				**$843**	**$843**	*RMU-2 mon well pump maintenance & replacement: post-closure & perpetual care frequency are equal*	

PCC-9.02: RMU-2 (2-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.02.23 Drainage Ditch Repair						ditches estimated to be 10 feet in width	
RMU-2 Drainage Ditches						Perimeter Ditch + Drainage Tile System = 3,700 + 5,580 = 9,280 LF	drainage ditches specific to RMU-2 unit
Facility-wide Drainage Ditches						*22600 LF div by 8 units = 2825 LF* 0 LF for RMU-2	*drainage ditches in non-specific areas of facility*
RMU-2 Downchutes						*685 LF 26" pipe 266 LF 6" pipe*	
Drainage Ditch Repair	0.021	acre	$5,698.00	$120	$120	9,280 LF x 10 ft/LF = 2.13 acres @ 1.0% per year = 0.021 acres	unit price based upon $5,698/acre (RMU-1 Assembly 14.20)
Downchute Pipe Cleaning 26"	34.25	LF	$2.14	$73	$73	685 LF x 5.0% per year = 34.25 LF	DEC 2004 rate * deflator (2004-2010) for cleaning 8" dia pipe
Downchute Pipe Cleaning 6"	13.3	LF	$2.14	$28	$28	266 LF x 5.0% per year = 13.3 LF	DEC 2004 rate * deflator (2004-2010) for cleaning 8" dia pipe
Subt - Drainage Ditch Repair				**$221**	**$221**	*stormwater drainage ditch repair*	
						The cost of repair of facility-wide ditches is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.02.24 Drainage Ditch Cleaning						ditches estimated to be 10 feet wide; sediment estimated to be 4 inches deep.	
RMU-2 Drainage Ditches						9,280 LF	drainage ditches specific to RMU-2 unit
Facility-wide Drainage Ditches						*22600 LF div by 8 units = 2825 LF* 0 LF for RMU-2	*drainage ditches in non-specific areas of facility*
Drainage Ditch Sediment Cleaning	8.24	CY	$2.38	$20	$20	9,280 LF x 10.0 ft/LF x 0.333 feet (4")/27 = 1,145 CY @ 1%/yr = 11.46 CY	unit price based upon FAC Ponds 1/2 excavation (6.11)
Transportation of Ditch Sediment	3.9	miles	$3.25	$13	$13	15.5 tons @ 20 tons/load = 0.77 loads @ 5 miles per load = 3.9 miles	unit price based upon FAC Ponds 1/2 transportation (6.13)
Disposal of Ditch Sediment	15.5	ton	$35.00	$543	$543	11.46 CY @ 1.35 ton/CY = 15.5 tons	unit price based upon FAC Ponds 1/2 disposal (6.14)
Subt - Drainage Ditch Cleaning				**$575**	**$575**	*stormwater drainage ditch cleaning*	
						The cost of cleaning of facility-wide ditches is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.02.25 Basin Cleaning						sediment estimated to be 4 inches deep.	
Basin No. 1						*140625 SF div by 8 units = 17578 SF*	
Basin No. 2						*150000 SF div by 8 units = 18750 SF*	
Subt--Basin Cleaning				**$0**	**$0**	*facility stormwater basin cleaning*	
						The cost of cleaning of facility basins is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.02.26 Culvert Maint/Replace						average culvert = 40 feet in length and 18 inches in diameter; replace one 40-foot sections/year	
RMU-2 *Culverts*						*2 culverts x 40 feet long = 80 LF*	culverts specific to RMU-2 unit
Facility-wide Culverts						*20 culverts x 40 feet long = 800 LF div by 8 units =* 0 LF for RMU-2	*culverts in non-specific areas of facility*
Culvert Cleaning - 18" diameter avg	80	LF	$2.14	$171	$171	80 LF	DEC 2004 rate * deflator (2004-2010)
Repl Culvert - 18" diam avg (RMU-2)	40	LF	$11.61	$464	$464	80 LF @ 1 culvert/yr = 40 LF	DEC 2004 rate * deflator (2004-2010)
Repl Culv't - 18" diam avg (sitewide)	0	LF	$22.35	$0	$0	40.0 LF @ 1.00 culvert/yr = 40 LF 0 LF for RMU-2	DEC 2004 rate * deflator (2004-2010)
Replace Culvert - Ditch Excavation	30	CY	$2.96	$89	$89	40.0 LF x 0.75 CY/LF = 30 CY	DEC 2004 rate * deflator (2004-2010)
Replace Culvert - Bkfill/Compaction	30	CY	$3.86	$116	$116	30 CY	DEC 2004 rate * deflator (2004-2010)
Subt - Culvert Maint/Replacement				**$840**	**$840**	*culvert maintenance and replacement*	
						The cost of cleaning of maintaining facility-wide drainage is provided in post-closure estimate for 8 other units at the facility.	
(Subt: Assemb PCC-9.02.23 thru 9.02.26)				**$1,636**	**$1,636**	RMU-2 *storm drainage maintenance & replacement: post-closure & perpetual care frequency are equal*	

PCC-9.02: RMU-2 (2-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.02.27 Road Maint/Replace						gravel roads = 15 feet wide; asphalt roads = 20 feet wide	
RMU-2 *Gravel Roads*						*3700 LF x 15 feet wide/ 9 SF/SY = 6167 SY @ 2% per year = 123.3 SY*	
Facility-wide Asphalt Roads						*21120 LF x 20 feet wide = 422400 SF @ 1% per year =* 0 SF for RMU-2	*asphalt roads in non-specific areas of facility*
RMU-2 Gravel Road Repair	123.3	SY	$3.12	$385	$385	123.3 SY	DEC 2004 rate * deflator (2004-2010)
Facility-wide Asphalt Roads	0	SF	$1.35	$0	$0	4,224.0 SF div by 8 units = 528.0 SF 0 SF for RMU-2	DEC 2004 rate * deflator (2004-2010)
Subt - Road Maint/Replacement				**$385**	**$385**	*road maintenance and replacement*	
						The cost of cleaning of maintaining facility-wide roads is provided in post-closure estimate for 8 other units at the facility.	
(Subt: Assemb PCC-9.02.27)				**$385**	**$385**	*RMU-2 road maintenance & replacement*	

Total Non-Super hours 141.8

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.02.28 PPE Use/H&S Planning						Level C @ 10%; Mod Level C @ 15%; Level D @ 75% for tot non-supv hrs for all tasks; HASP @ 2.5% of non-supv hrs	
PPE Usage - Level D	13.1	days	$0.00	$0	$0	141.8 hours @ 8 hr/day = 17.7 days @ 75% "D" days = 13.3 days	75% of non-supv hrs in Level D (used facility price: $0/day)
PPE Usage - Mod Level C	2.6	days	$9.00	$23	$23	141.8 hours @ 8 hr/day = 17.7 days @ 15% "C" days = 2.6 days	15% of non-supv hrs in Mod Level C (used facility price: $9/day)
PPE Usage - Level C	1.8	days	$25.00	$45	$45	141.8 hours @ 8 hr/day = 17.7 days @ 10% "C" days = 1.8 days	10% of non-supv hrs in Level C (used facility price: $25/day)
Health & Safety Officer	3.5	hours	$75.00	$263	$263	141.8 hours @ 2.5% hr/hr = 3.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Subt - PPE Usage/H&S Planning				**$331**	**$331**		
PCC-9.02.29 Supervision							
Foreman	0	hours	$65.00	$0	$0	Included in Post-Closure cost estimates for other 7-units at the facility that generate leachate	loaded labor rate: loaded labor rate 2011 3rd party quote
Site Project Manager	0	hours	$75.00	$0	$0	Included in Gen'l Contractor G&A/Home Office indirect costs	loaded labor rate: loaded labor rate 2011 3rd party quote
Subtotal - Supervision				**$0**	**$0**		
(Subt: Assemb PCC-9.02.28 thru 9.02.29)				**$331**	**$331**	supervision, health & safety, and certification	

PCC-9.02 (2-Cells): RMU-2 Direct Cost				**$37,683**	**$28,802**

PCC-9.02: RMU-2 (2-Cells)

Total Cost Summary

Cost Category	Proposed Percent of Direct Cost	Proposed Annual Cost Post - Closure Period	Proposed Cost - Annual Perpetual Care	Cost Range
Direct Costs		$37,683	$28,802	
Plus Indirect Costs/Profit:				
Site Activity Management Costs	3.00%	$1,130	$864.07	Included in Gen'l Contractor G&A/Home Office (note: DEC uses 3%)
Gen'l Contractor G&A/Home Office	4.00%	$1,507	$1,152	5% for post-closure. (note: DEC uses 4%)
Pre-Construction Design Costs	1.00%	$377	$288.02	For post-closure, design costs minimal and included in Assb 6.21. (note: DEC uses 1%)
Engineering During Construction	1.00%	$377	$288.02	For post-closure, design costs minimal and included in Assb 6.21. (note: DEC uses 1%)
General Contractor Profit	6.00%	$2,261	$1,728	Contractor Profit included in unit rates & Gen' Cont G&A/Home Office (Note DEC adds 6%)
Indirect Costs & Profit	15.00%	$5,652	$4,320	
Subtotal - Direct/Indirect Costs		$43,336	$33,123	
Plus Contingency	15.00%	$6,500	$4,968	DEC uses 15% applied to total cost
Total - PCC-9.02: RMU-2 (2-Cells)		**$49,836**	**$38,091**	

RMU-2 Years of Post Closure   Years Since Closure   N/A   Post Closure Years Remaining   30

Post Closure Costs Remaining Years	**$1,495,083**
Post Closure Costs 30-Years	**$1,495,083**

Liner Feet of MSE Wall		Cell #	Acres	Cummulative Acres
1-Cell Scenario (Cell 20)	1665	20	6.9	6.9
2-Cell Scenario (Cells 18,20)	2095	18	6.2	13.1
3-Cell Scenario (Cells 18,20,19)	3815	19	6.4	19.5
4-Cell Scenario (Cells 18,20,19,17)	4200	17	5.9	25.4
5-Cell Scenario (Cells 18,20,19,17,16)	5230	16	6.5	31.9
6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A	15	6.6	38.5
		Total Area	38.5	acres

Includes slope correction

PCC-9.03: RMU-2 (3-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References

RMU-2 Parameters - Area	19.5 acres =	94,380 SY =	849,420 SF =	849.4 MSF	31680 LF (6 Mi.) = total est'd perimeter fencing for eight (8) SLFs
RMU-2 Parameters - Fencing					0 LF = portion of perimeter fencing for RMU-2

Perimeter Ditch	4,700 linear feet	560+585+670+500+600+775+710+300 = 4,700
Drainage Tile System	4,405 linear feet	19.5 acres * 426 LF/acre = 8,307 LF
MSE Wall	3,815 linear feet	

PCC-9.03.1 Annual Visual Inspections						make visual inspections and log results; two persons required	
Post-Closure							
Technician - Landfill	6.8	hours	$38.00	$258	$0	2 hrs/insp x 1.7 insp/year x 2 per crew = 6.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Landfill Leachate Syst	6.8	hours	$38.00	$258	$0	2 hrs/insp x 1.7 insp/year x 2 per crew = 6.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Perimeter Fencing	0	hours	$38.00	$0	$0	3 hrs/insp x 2.0 insp/year x 2 per crew/ 8 facility units = 1.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Storm Water Mgt Syst	7.2	hours	$38.00	$274	$0	2 hrs/insp x 1.8 insp/year x 2 per crew = 7.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - 25-Yr Storm Event	0	hours	$38.00	$0	$0	included above	this activity s/b included with annual storm water inspect'ns
Engineer - MSE Wall Inspection	12	hours	$130.00	$1,560	$0	12 hrs/insp x 1.0 insp/year x 1 per crew = 12.0 hours	
Subtotal - Annual Inspections				**$2,350**	**$0**	RMU-2 post-closure inspections	
Perpetual Care						Perpetual Care Frequencies according to Page 11 of Site-Wide and RMU-2 Post-Closure Plans	
Technician - Landfill	4.0	hours	$38.00	$0	$152	2 hrs/insp x 1.0 insp/year x 2 per crew = 4.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Landfill Leachate Syst	4.0	hours	$38.00	$0	$152	2 hrs/insp x 1.0 insp/year x 2 per crew = 4.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Perimeter Fencing	0.0	hours	$38.00	$0	$0	4 hrs/insp x 1.0 insp/year x 2 per crew/ 8 facility units = 1.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Storm Water Mgt Syst	4.2	hours	$38.00	$0	$160	2 hrs/insp x 1.04 insp/year x 2 per crew = 4.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - 25-Yr Storm Event	0.0	hours	$38.00	$0	$0	included above	this activity s/b included with annual storm water inspect'ns
Engineer - MSE Wall Inspection	12	hours	$130.00	$0	$1,560	12 hrs/insp x 1.0 insp/year x 1 per crew = 12.0 hours	
Subtotal - Annual Inspections Perp-Care				**$0**	**$2,024**	RMU-2 perpetual care inspections	
(Subt: Assemb PCC-9.03.1)				**$2,350**	**$2,024**	RMU-2 visual inspections. The Cost for facility fence inspection is already provided in the post closure estimate for 8 other units	

PCC-9.03.2 Perimeter Fence Maint.						one-eighth of total perimeter fencing allocated per SLF unit; 2% annual replacement projected	
Subt - Perimeter Fence Maint.				**$0**	**$0**	*The Cost for facility fence repair is already provided in the post closure estimate for 8 other units*	
(Subt: Assemb PCC-9.03.2)				**$0**	**$0**		

PCC-9.03.3 Maint. Benchmarks/Surv						Annual inspection only	
Maint of Benchmarks & Surveying	0	acres	$0.00	$0	$0	Included in PCC-9.03.1	
Subt - Benchmarks & Surveying				$0	$0		
(Subt: Assemb PCC-9.03.3)				**$0**	**$0**		

PCC-9.03: RMU-2 (3-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.03.4 Groundwater Monitoring						*sampling crew composed of two technicians; 21 monitoring wells*	
Monit'g Events & Samples/Event						*0.0 quart'ly + 40 semi-ann + 1.0 b-ann'l x 1.05 each = 42.5 samp*	*includes 5% QA sampling*
Post-Closure							
Technician	85	hours	$38.00	$3,230	$0	42.5 samps @ 1.0 hrs/samp x 2 per crew = 85 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	42.5	samp	$25.00	$1,063	$0	42.5 samps	bottles, shipping supplies
VOCs	42.5	samp	$105.00	$4,463	$0	42.5 samps	Average of three quotes
Subt - GW Monitoring				**$8,755**	**$0**	*post closure groundwater monitoring*	
Monit'g Events & Samples/Event						21 wells @ sample/5 years *1.05 each =* 4.4 samp/yr	
Perpetual Care						Perpetual care groundwater monitoring once every five years	
Technician	8.8	hours	$38.00	$0	$334	4.4 samps @ 1.0 hrs/samp x 2 per crew = 8.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	4.4	samp	$25.00	$0	$110	4.4 samples	bottles, shipping supplies
VOCs	4.4	samp	$105.00	$0	$462	4.4 samples	Average of three quotes
Subt - GW Monitoring				**$0**	**$906**	*perpetual care groundwater monitoring*	
PCC-9.03.5 Outfalls 002,003,004 SPDES Mon						production rate = 2 hours per sample for a one-person crew: each year of monitoring during closure	
Weekly Sampling Events						12 months = 52 weeks @ 3 outfalls @ 1 sample/OF = 156 samples	sampling & analysis according to SPDES Permit
Subt - SPDES Outfall Sampling & Analysis				**$0**	**$0**	*The Cost for facility stormwater discharge is already provided in the post closure estimate for 8 other units*	
PCC-9.03.6 Discharge Monitoring Report						Monthly Discharge Monitoring Reports	
Subt - Discharge Monitoring Report				**$0**	**$0**	submittal of SPDES Permit required Discharge Monitoring Report (DMR)	
						The Cost for facility stormwater discharge is already provided in the post closure estimate for 8 other units	
(Subt: Assemb PCC-9.03.4 thru 9.03.6)				**$8,755**	**$906**	*RMU-2 groundwater & stormwater monitoring activities*	
PCC-9.03.7 Landfill Cover Maint.							
Replacement of Cover	0.0975	acre	$20,973.33	$2,045	$2,045	19.5 acre @ 0.5% per year = 0.0975 acres/yr	unit price based upon vegetation, topsoil, from RMU-1,
Subt - Landfill Cover Maint.				**$2,045**	**$2,045**	*RMU-2 upper cap maintenance and replacement*	Assemblies 14.17 thru 14.18
PCC-9.03.8 Mowing/Grooming							
Mowing	849.4	MSF	$3.21	$2,729	$2,729	849.4 MSF @ 1.0 per year = 849.4 MSF	DEC 2004 rate * deflator (2004-2010)
Fertilizing	169.9	MSF	$3.82	$649	$649	849.4 MSF @ 1.0 per 5.0 years = 169.9 MSF	DEC 2004 rate * deflator (2004-2010)
Subt - Mowing/Grooming				**$3,378**	**$3,378**	RMU-2 *mowing and fertilizing*	
(Subt: Assemb PCC-9.03.7 thru 9.03.8)				**$5,423**	**$5,423**	*RMU-2 cap maintenance activities: post-closure & perpetual care frequency are equal*	
PCC-9.03.9 MSE Wall Maint.						$3.03 based on 6,600 LF for 6-cell scenario.	
MSE Wall Maint.	3815	LF	$3.03	$11,559	$11,559	3,815 LF of MSE wall	WM/Golder Guidance Document (12-1-10)
Subt - MSE Wall Maint.				**$11,559**	**$11,559**	*RMU-2 MSE Wall maintenance*	
(Subt: Assemb PCC-9.03.9)				**$11,559**	**$11,559**		

PCC-9.03: RMU-2 (3-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.03.10 Leachate System Mgmt						operation time = 8 hours/day x 5 days/week x 50 weeks/year = 2,000 hours	
Leachate Treatment	73615	gal	$0.0178	$1,310	$0	73,615 gals estimated annual leachate volume based average prediction 0-30 years post closure	unit price derived from AWTS O&M model
Leachate Treatment - Perpetual Care	14617	gal	$0.0178	$0	$260	14,617 perpetual care average years 31-60 Taken from RMU-2 2012 LeachGenMode	
Leach Treat Syst. Capital Repl Cost	0	LS	$17,642.00	$0	$0	$3,087 K div by 25 year life = $123,495/yr div by 7 facility units = $17,642 each (costs allocated to other 7 units at	DEC estimate of AWTS capital replacement costs @ 25 yrs
						The Cost for capital replacement of AWTS is already provided in the post closure estimate for 7 other units that generate leachate	
Laborer	24	hours	$39.00	$936	$936	2 hrs/mon x 12 mon/year = 24 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician	24	hours	$38.00	$912	$912	2 hrs/mon x 12 mon/year = 24 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Primary Leachate VOC Samp & Analysis	6.3	sample	$105.00	$662	$662	3 sumps x 1.05 per sump x 2.0 event/yr = 6.3 samples	Avg. of three lab quotes
Primary Leachate Metals Samp & Analysis	6.3	sample	$188.00	$1,184	$1,184	3 sumps x 1.05 per sump x 2.0 event/yr = 6.3 samples	Avg. of three lab quotes
Primary Leachate PCBs Samp & Anaylsis	6.3	sample	$133.33	$840	$840	3 sumps x 1.05 per sump x 2.0 event/yr = 6.3 samples	Avg. of three lab quotes
Secondary Leachate VOC Samp & Analysis	6.3	sample	$105.00	$662	$662	3 sumps x 1.05 per sump x 2.0 event/yr = 6.3 samples	Avg. of three lab quotes
Secondary Leachate Metals Samp & Analysis	3.2	sample	$188.00	$602	$602	3 sumps x 1.05 per sump = 1.0 event/yr = 3.2 samples	Avg. of three lab quotes
Secondary Leachate PP Organics Samp & Analysis	3.2	sample	$633.33	$2,027	$2,027	3 sumps x 1.05 per sump = 1.0 event/yr = 3.2 samples	Avg. of three lab quotes
Electrical Costs - Pumps	384.6	KWH	$0.086	$33	$33	343.7 hr/yr x 1.5 hp/hr x 0.746 kw/hp = 384.6 KWH	2004 DEC Rate * Implicit Deflator
Replacement of Main Pump T-150	0.2	pump	$14,425.00	$2,885	$2,885	1 pump per 5 years = 0.2 pumps	30 hp pump, site experience
Replacement of Secondary Pump T-150	0.0	pump	$14,425.00	$0	$0	1 pump per 5 years = 0.2 pumps	Pump not necessary in post closure
Replace Primary Sump Pumps	0.6	pump	$1,382.00	$829	$829	3 pumps x 20.0% pu/yr = 0.6 pumps	1.5 hp submersible pump, site experience
Replace Secondary Sump Pumps	0.45	pump	$850.00	$383	$383	3 pumps x 15.0% pu/yr = 0.45 pumps	4" subm pump, 0.5 hp, , site experience
Replacement of Pump Dischg Hose	1.1	hose	$211.54	$233	$233	1.1 pumps x 1 per pump = 1.1	DEC 2004 rate * deflator (2004-2010)
Disposal of Pumps/Hoses	11	CF	$12.45	$137	$137	1.1 pu/hos @ 10 CF/pump = 11 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Replacement of Piping - 2"/4"	2.4	LF	$53.25	$128	$128	480 LF @ 0.5% per year = 2.4 LF/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Piping - 2"/4"	0.8	CF	$12.45	$10	$10	2.4 LF @ 0.33 CF/LF = 0.8 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Replace Piping - 4"/8" & 6"/10"	15.7	LF	$73.50	$1,154	$1,154	3,140 LF @ 0.5% per year = 15.7 LF/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Piping - 4"/8" & 6"/10"	7.9	CF	$12.45	$98	$98	15.7 LF @ 0.50 LF/drum = 7.9 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Pipe Cleaning - 8" diameter	2103	LF	$2.14	$4,500	$4,500	2,103 LF @ 1.0 events/yr = 2,103 LF	DEC 2004 rate * deflator (2004-2010)
Subt - Leachate Coll Syst Mgmt				**$19,524**	**$18,474**	*annual O&M costs plus capital replacement of treatment system, pumps, and piping*	
PCC-9.03.11 AWTS Operation						Shift operation of the AWTS for 12 months	no DEC estimate for this activity: DEC Estimate included in unit rate
Subt - AWTS Operation				**$0**	**$0**	AWTS Operation - operation of AWTS for twelve (12) months during post closure or perpetual care of the site	
						The Cost for operation of AWTS is already provided in the post closure estimate for 7 other units that generate leachate	
PCC-9.03.12 Site Waters Treatment							
Subt - Site Waters Treatment				**$0**	**$0**	*The Cost for treatment of of site waters is already provided in the post closure estimate for 7 other units*	Labor included in PCC-1.7a
PCC-9.03.13 Batch Tank Qualification						2 Batch Qualification tanks prior to discharge to facultative ponds	To Meet LDR requirements
Subt - Batch Tank Qualification				**$0**	**$0**	*The Cost for tank qualifications is already provided in the post closure estimate for 7 other units*	Samples collected by lab technician
PCC-9.03.14 Pond Sampling & Analysis (Outfall 001)						production rate = 2.0 hours per composite sample for a three-person crew	SPDES PreQual Sampling of Outfall 001 prior to discharge
Batch Sampling Events						*1 events @ 3 samp/evnt= 3 samples*	sampling & analysis prior to pond discharge
Subt - Pond Sampling & Analysis				**$0**	**$0**	*The Cost for pond qualifications is already provided in the post closure estimate for 7 other units*	

PCC-9.03: RMU-2 (3-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.03.15 Pond S&A Certification & Report						one event per year for divers to check discharge pipe; one predischarge qualification report	
Subt - S&A Cert'n & Report				$0	$0	*diver(s) to check discharge pipe; also engineer's predischarge qualification report*	
						The Cost for pond qualifications report and diver inspections of outfall is already provided in the post closure estimate for 7 other units	
PCC-9.03.16 Empty (Pump) FAC Pond to Outfall 001						prod'n rate = 960,000 gals/day = 60,000 gals/hr = 1,000 gals/min per facility est @ 16 hrs/day O&M	Treated wastewater from all 7 units
FAC Pond 1/2 Inventory in Gallons		*gals*	*n/a*			45.8 *total hours req'd to pump*	& site waters
Subtotal - Pump FAC Pond 1/2				$0	$0	*transfer contents of FAC Pond to discharge pipe to Niagara River* (3,000 ft). The Cost for discharge to outfall is already provided in the post closure estimate for 7 other units	
(Subt: Assemb PCC-9.03.10 thru 9.03.16)				**$19,524**	**$18,474**	RMU-2 *share of annual O&M and capital costs for leachate collection & treatment: provided in post closure cost estimate for 7 other units at facility*	
PCC-9.03.17 N/A							
Subt - N/A				$0	$0		
PCC-9.03.18 N/A							
Subt - N/A				$0	$0		
PCC-9.03.19 N/A							
Subt - N/A				$0	$0		
(Subt: Assemb PCC-9.03.17 thru 9.03.19)				$0	$0	RMU-2 share of annual leachate transport costs - n/a, as leachate pumped directly to the AWTS	
PCC-9.03.20 Tank Assessments						sixteen (16) tanks requiring internal & external inspections once every five years by 1 PE + 2 Techs	
Internal & External Inspections						*16 tanks @ 5 yr inspect = 3.2 tnks/yr @ 7 areas = 0.5 tnks/yr*	
Subt - Tank Assessments				$0	$0	*inspection of 16 tanks*	
						The Cost for tank assessment is already provided in the post closure estimate for 7 other units	
PCC-9.03.21 Tank Assessments						thirty (32) tanks requiring only external inspections once every five years by 1 PE	
External Only Inspections						*30 tanks @ 5 yr inspect = 6.0 tnks/yr @ 7 areas = 0.9 tnks/yr*	
Subt - Tank Assessments				$0	$0	*inspection of 32 tanks*	
						The Cost for tank assessment is already provided in the post closure estimate for 7 other units	
(Subt: Assemb PCC-9.03.20 thru 9.03.21)				$0	$0	RMU-2 *share of annual tank assessment costs: post-closure & perpetual care frequency are equal*	
PCC-9.03.22 Replace Mon Well Pump							
Replace Mon Well Pumps	0.53	pump	$900.00	$477	$477	21 pumps @ 2.5% per year = 0.53 pumps/yr	Site experience third party costs
Technician	2.0	Hour	$38.00	$76	$76	2 hours per year	third party labor costs
Disposal of Pumps	0.53	CF	$12.45	$7	$7	0.53 pumps @ 1.0 CF/pump = 0.53 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Repair Mon Well Concrete Pads	0.53	pad	$131.50	$70	$70	21 pads @ 2.5% per year = 0.53 pads/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Well Surface Concrete	1.1	CF	$12.45	$14	$14	0.53 pads @ 2.0 CF/pad = 1.1 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Repair Mon Well Covers	0.53	each	$371.63	$197	$197	21 covers @ 2.5% per year = 0.53 covers/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Mon Well Covers	0.27	CF	$12.45	$3	$3	0.53 covers @ 0.5 CF/cover = 0.27 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Subt - Replace Mon Well Pumps				**$843**	**$843**	*monitoring well pump maintenance and replacement*	
(Subt: Assemb PCC-9.03.22)				**$843**	**$843**	*RMU-2 mon well pump maintenance & replacement: post-closure & perpetual care frequency are equal*	

PCC-9.03: RMU-2 (3-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.03.23 Drainage Ditch Repair						ditches estimated to be 10 feet in width	
RMU-2 Drainage Ditches						Perimeter Ditch + Drainage Tile System = 4,700 + 8,307 = 13,007 LF	drainage ditches specific to RMU-2 unit
Facility-wide Drainage Ditches						*22600 LF div by 8 units = 2825 LF* 0 LF for RMU-2	*drainage ditches in non-specific areas of facility*
RMU-2 Downchutes						*685 LF 26" pipe 266 LF 6" pipe*	
Drainage Ditch Repair	0.03	acre	$5,698.00	$171	$171	13,007 LF x 10 ft/LF = 3.0 acres @ 1.0% per year = 0.03 acres	unit price based upon $5,698/acre (RMU-1 Assembly 14.20)
Downchute Pipe Cleaning 26"	34.25	LF	$2.14	$73	$73	685 LF x 5.0% per year = 34.25 LF	DEC 2004 rate * deflator (2004-2010) for cleaning 8" dia pipe
Downchute Pipe Cleaning 6"	13.3	LF	$2.14	$28	$28	266 LF x 5.0% per year = 13.3 LF	DEC 2004 rate * deflator (2004-2010) for cleaning 8" dia pipe
Subt - Drainage Ditch Repair				**$273**	**$273**	*stormwater drainage ditch repair*	
						The cost of repair of facility-wide ditches is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.03.24 Drainage Ditch Cleaning						ditches estimated to be 10 feet wide; sediment estimated to be 4 inches deep.	
RMU-2 Drainage Ditches						13,007 LF	drainage ditches specific to RMU-2 unit
Facility-wide Drainage Ditches						*22600 LF div by 8 units = 2825 LF* 0 LF for RMU-2	*drainage ditches in non-specific areas of facility*
Drainage Ditch Sediment Cleaning	16.1	CY	$2.38	$38	$38	13,007 LF x 10.0 ft/LF x 0.333 feet (4")/27 = 1,606 CY @ 1%/yr = 16.1 CY	unit price based upon FAC Ponds 1/2 excavation (6.11)
Transportation of Ditch Sediment	5.4	miles	$3.25	$18	$18	21.7 tons @ 20 tons/load = 1.1 loads @ 5 miles per load = 5.4 miles	unit price based upon FAC Ponds 1/2 transportation (6.13)
Disposal of Ditch Sediment	21.7	ton	$35.00	$760	$760	16.1 CY @ 1.35 ton/CY = 21.7 tons	unit price based upon FAC Ponds 1/2 disposal (6.14)
Subt - Drainage Ditch Cleaning				**$815**	**$815**	*stormwater drainage ditch cleaning*	
						The cost of cleaning of facility-wide ditches is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.03.25 Basin Cleaning						sediment estimated to be 4 inches deep.	
Basin No. 1						*140625 SF div by 8 units = 17578 SF*	
Basin No. 2						*150000 SF div by 8 units = 18750 SF*	
Subt--Basin Cleaning				**$0**	**$0**	*facility stormwater basin cleaning*	
						The cost of cleaning of facility basins is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.03.26 Culvert Maint/Replace						average culvert = 40 feet in length and 18 inches in diameter; replace one 40-foot sections/year	
RMU-2 *Culverts*						*3 culverts x 40 feet long = 120 LF*	culverts specific to RMU-2 unit
Facility-wide Culverts						*20 culverts x 40 feet long = 800 LF div by 8 units =* 0 LF for RMU-2	*culverts in non-specific areas of facility*
Culvert Cleaning - 18" diameter avg	120	LF	$2.14	$257	$257	120 LF	DEC 2004 rate * deflator (2004-2010)
Repl Culvert - 18" diam avg (RMU-2)	40	LF	$11.61	$464	$464	120 LF @ 1 culvert/yr = 40 LF	DEC 2004 rate * deflator (2004-2010)
Repl Culv't - 18" diam avg (sitewide)	0	LF	$22.35	$0	$0	40.0 LF @ 1.00 culvert/yr = 40 LF 0 LF for RMU-2	DEC 2004 rate * deflator (2004-2010)
Replace Culvert - Ditch Excavation	30	CY	$2.96	$89	$89	40.0 LF x 0.75 CY/LF = 30 CY	DEC 2004 rate * deflator (2004-2010)
Replace Culvert - Bkfill/Compaction	30	CY	$3.86	$116	$116	30 CY	DEC 2004 rate * deflator (2004-2010)
Subt - Culvert Maint/Replacement				**$926**	**$926**	*culvert maintenance and replacement*	
						The cost of cleaning of maintaining facility-wide drainage is provided in post-closure estimate for 8 other units at the facility.	
(Subt: Assemb PCC-9.03.23 thru 9.03.26)				**$2,014**	**$2,014**	RMU-2 *storm drainage maintenance & replacement: post-closure & perpetual care frequency are equal*	

PCC-9.03: RMU-2 (3-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.03.27 Road Maint/Replace						gravel roads = 15 feet wide; asphalt roads = 20 feet wide	
RMU-2 *Gravel Roads*						*4700 LF x 15 feet wide/ 9 SF/SY = 7833 SY @ 2% per year = 157 SY*	
Facility-wide Asphalt Roads						*21120 LF x 20 feet wide = 422400 SF @ 1% per year =* 0 SF for RMU-2	*asphalt roads in non-specific areas of facility*
RMU-2 Gravel Road Repair	157	SY	$3.12	$490	$490	157 SY	DEC 2004 rate * deflator (2004-2010)
Facility-wide Asphalt Roads	0	SF	$1.35	$0	$0	4,224.0 SF div by 8 units = 528.0 SF 0 SF for RMU-2	DEC 2004 rate * deflator (2004-2010)
Subt - Road Maint/Replacement				**$490**	**$490**	*road maintenance and replacement*	
						The cost of cleaning of maintaining facility-wide roads is provided in post-closure estimate for 8 other units at the facility.	
(Subt: Assemb PCC-9.03.27)				**$490**	**$490**	*RMU-2 road maintenance & replacement*	

Total Non-Super hours 167.8

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.03.28 PPE Use/H&S Planning						Level C @ 10%; Mod Level C @ 15%; Level D @ 75% for tot non-supv hrs for all tasks; HASP @ 2.5% of non-supv hrs	
PPE Usage - Level D	13.4	days	$0.00	$0	$0	167.8 hours @ 8 hr/day = 21.0 days @ 75% "D" days = 15.8 days	75% of non-supv hrs in Level D (used facility price: $0/day)
PPE Usage - Mod Level C	3.1	days	$9.00	$28	$28	167.8 hours @ 8 hr/day = 21.0 days @ 15% "C" days = 3.1 days	15% of non-supv hrs in Mod Level C (used facility price: $9/day)
PPE Usage - Level C	2	days	$25.00	$50	$50	167.8 hours @ 8 hr/day = 21.0 days @ 10% "C" days = 2.1 days	10% of non-supv hrs in Level C (used facility price: $25/day)
Health & Safety Officer	4.2	hours	$75.00	$315	$315	167.8 hours @ 2.5% hr/hr = 4.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Subt - PPE Usage/H&S Planning				**$393**	**$393**		
PCC-9.03.29 Supervision							
Foreman	0	hours	$65.00	$0	$0	Included in Post-Closure cost estimates for other 7-units at the facility that generate leachate	loaded labor rate: loaded labor rate 2011 3rd party quote
Site Project Manager	0	hours	$75.00	$0	$0	Included in Gen'l Contractor G&A/Home Office indirect costs	loaded labor rate: loaded labor rate 2011 3rd party quote
Subtotal - Supervision				**$0**	**$0**		
(Subt: Assemb PCC-9.03.28 thru 9.03.29)				**$393**	**$393**	supervision, health & safety, and certification	

PCC 9.03 (1-Cell): RMU-2 Direct Cost				**$51,352**	**$42,126**

PCC-9.03: RMU-2 (3-Cells)

Total Cost Summary

Cost Category	Proposed Percent of Direct Cost	Proposed Annual Cost Post - Closure Period	Proposed Cost - Annual Perpetual Care	Cost Range
Direct Costs		$51,352	$42,126	
Plus Indirect Costs/Profit:				
Site Activity Management Costs	3.00%	$1,541	$1,263.79	Included in Gen'l Contractor G&A/Home Office (note: DEC uses 3%)
Gen'l Contractor G&A/Home Office	4.00%	$2,054	$1,685	5% for post-closure. (note: DEC uses 4%)
Pre-Construction Design Costs	1.00%	$514	$421.26	For post-closure, design costs minimal and included in Assb 6.21. (note: DEC uses 1%)
Engineering During Construction	1.00%	$514	$421.26	For post-closure, design costs minimal and included in Assb 6.21. (note: DEC uses 1%)
General Contractor Profit	6.00%	$3,081	$2,528	Contractor Profit included in unit rates & Gen' Cont G&A/Home Office (Note DEC adds 6%)
Indirect Costs & Profit	15.00%	$7,703	$6,319	
Subtotal - Direct/Indirect Costs		$59,055	$48,445	
Plus Contingency	15.00%	$8,858	$7,267	DEC uses 15% applied to total cost
Total - PCC-9.03: RMU-2 (3-Cells)		$67,913	$55,712	

RMU-2 Years of Post Closure | Years Since Closure N/A | Post Closure Years Remaining 30

Post Closure Costs Remaining Years	**$2,037,385**
Post Closure Costs 30-Years	**$2,037,385**

Liner Feet of MSE Wall		Cell #	Acres	Cummulative Acres
1-Cell Scenario (Cell 20)	1665	20	6.9	6.9
2-Cell Scenario (Cells 18,20)	2095	18	6.2	13.1
3-Cell Scenario (Cells 18,20,19)	3815	19	6.4	19.5
4-Cell Scenario (Cells 18,20,19,17)	4200	17	5.9	25.4
5-Cell Scenario (Cells 18,20,19,17,16)	5230	16	6.5	31.9
6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A	15	6.6	38.5
		Total Area	38.5	acres

Includes slope correction

PCC-9.04: RMU-2 (4-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References

RMU-2 Parameters - Area	25.4 acres = 122,936 SY = 1,106,424 SF = 1,106.4 MSF	31680 LF (6 Mi.) = total est'd perimeter fencing for eight (8) SLFs	
RMU-2 Parameters - Fencing		0 LF = portion of perimeter fencing for RMU-2	
Perimeter Ditch	4,825 linear feet	1270+1200+600+500+670+585 = 4,825	
Drainage Tile System	5,847 linear feet	25.4 acres * 426 LF/acre = 10,820 LF	
MSE Wall	4,200 linear feet		

PCC-9.04.1 Annual Visual Inspections						make visual inspections and log results; two persons required	
Post-Closure							
Technician - Landfill	6.8	hours	$38.00	$258	$0	2 hrs/insp x 1.7 insp/year x 2 per crew = 6.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Landfill Leachate Syst	6.8	hours	$38.00	$258	$0	2 hrs/insp x 1.7 insp/year x 2 per crew = 6.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Perimeter Fencing	0	hours	$38.00	$0	$0	3 hrs/insp x 2.0 insp/year x 2 per crew/ 8 facility units = 1.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Storm Water Mgt Syst	7.2	hours	$38.00	$274	$0	2 hrs/insp x 1.8 insp/year x 2 per crew = 7.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - 25-Yr Storm Event	0	hours	$38.00	$0	$0	included above	this activity s/b included with annual storm water inspect'ns
Engineer - MSE Wall Inspection	14	hours	$130.00	$1,820	$0	14 hrs/insp x 1.0 insp/year x 1 per crew = 14.0 hours	
Subtotal - Annual Inspections				**$2,610**	**$0**	RMU-2 post-closure inspections	
Perpetual Care						Perpetual Care Frequencies according to Page 11 of Site-Wide and RMU-2 Post-Closure Plans	
Technician - Landfill	4.0	hours	$38.00	$0	$152	2 hrs/insp x 1.0 insp/year x 2 per crew = 4.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Landfill Leachate Syst	4.0	hours	$38.00	$0	$152	2 hrs/insp x 1.0 insp/year x 2 per crew = 4.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Perimeter Fencing	0.0	hours	$38.00	$0	$0	4 hrs/insp x 1.0 insp/year x 2 per crew/ 8 facility units = 1.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Storm Water Mgt Syst	4.2	hours	$38.00	$0	$160	2 hrs/insp x 1.04 insp/year x 2 per crew = 4.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - 25-Yr Storm Event	0.0	hours	$38.00	$0	$0	included above	this activity s/b included with annual storm water inspect'ns
Engineer - MSE Wall Inspection	14	hours	$130.00	$0	$1,820	14 hrs/insp x 1.0 insp/year x 1 per crew = 14.0 hours	
Subtotal - Annual Inspections Perp-Care				**$0**	**$2,284**	RMU-2 perpetual care inspections	
(Subt: Assemb PCC-9.04.1)				**$2,610**	**$2,284**	RMU-2 visual inspections. The Cost for facility fence inspection is already provided in the post closure estimate for 8 other units	

PCC-9.04.2 Perimeter Fence Maint.						one-eighth of total perimeter fencing allocated per SLF unit; 2% annual replacement projected	
Subt - Perimeter Fence Maint.				**$0**	**$0**	*The Cost for facility fence repair is already provided in the post closure estimate for 8 other units*	
(Subt: Assemb PCC-9.04.2)				**$0**	**$0**		

PCC-9.04.3 Maint. Benchmarks/Surv						Annual inspection only	
Maint of Benchmarks & Surveying	0	acres	$0.00	$0	$0	Included in PCC-9.04.1	
Subt - Benchmarks & Surveying				$0	$0		
(Subt: Assemb PCC-9.04.3)				**$0**	**$0**		

PCC-9.04: RMU-2 (4-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.04.4 Groundwater Monitoring						*sampling crew composed of two technicians; 21 monitoring wells*	
Monit'g Events & Samples/Event						*0.0 quart'ly + 40 semi-ann + 1.0 b-ann'l x 1.05 each = 42.5 samp*	*includes 5% QA sampling*
Post-Closure							
Technician	85	hours	$38.00	$3,230	$0	42.5 samps @ 1.0 hrs/samp x 2 per crew = 85 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	42.5	samp	$25.00	$1,063	$0	42.5 samps	bottles, shipping supplies
VOCs	42.5	samp	$105.00	$4,463	$0	42.5 samps	Average of three quotes
Subt - GW Monitoring				**$8,755**	**$0**	*post closure groundwater monitoring*	
Monit'g Events & Samples/Event						21 wells @ sample/5 years *1.05 each =* 4.4 samp/yr	
Perpetual Care						Perpetual care groundwater monitoring once every five years	
Technician	8.8	hours	$38.00	$0	$334	4.4 samps @ 1.0 hrs/samp x 2 per crew = 8.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	4.4	samp	$25.00	$0	$110	4.4 samples	bottles, shipping supplies
VOCs	4.4	samp	$105.00	$0	$462	4.4 samples	Average of three quotes
Subt - GW Monitoring				**$0**	**$906**	*perpetual care groundwater monitoring*	
PCC-9.04.5 Outfalls 002,003,004 SPDES Mon						production rate = 2 hours per sample for a one-person crew: each year of monitoring during closure	
Weekly Sampling Events						12 months = 52 weeks @ 3 outfalls @ 1 sample/OF = 156 samples	sampling & analysis according to SPDES Permit
Subt - SPDES Outfall Sampling & Analysis				**$0**	**$0**	*The Cost for facility stormwater discharge is already provided in the post closure estimate for 8 other units*	
PCC-9.04.6 Discharge Monitoring Report						Monthly Discharge Monitoring Reports	
Subt - Discharge Monitoring Report				**$0**	**$0**	submittal of SPDES Permit required Discharge Monitoring Report (DMR)	
						The Cost for facility stormwater discharge is already provided in the post closure estimate for 8 other units	
(Subt: Assemb PCC-9.04.4 thru 9.04.6)				**$8,755**	**$906**	*RMU-2 groundwater & stormwater monitoring activities*	

PCC-9.04.7 Landfill Cover Maint.							
Replacement of Cover	0.127	acre	$20,973.33	$2,664	$2,664	25.4 acre @ 0.5% per year = 0.127 acres/yr	unit price based upon vegetation, topsoil, from RMU-1,
Subt - Landfill Cover Maint.				**$2,664**	**$2,664**	*RMU-2 upper cap maintenance and replacement*	Assemblies 14.17 thru 14.18
PCC-9.04.8 Mowing/Grooming							
Mowing	1106.4	MSF	$3.21	$3,555	$3,555	1,106.4 MSF @ 1.0 per year = 1,106.4 MSF	DEC 2004 rate * deflator (2004-2010)
Fertilizing	221.3	MSF	$3.82	$845	$845	1,106.4 MSF @ 1.0 per 5.0 years = 221.3 MSF	DEC 2004 rate * deflator (2004-2010)
Subt - Mowing/Grooming				**$4,400**	**$4,400**	RMU-2 *mowing and fertilizing*	
(Subt: Assemb PCC-9.04.7 thru 9.04.8)				**$7,064**	**$7,064**	*RMU-2 cap maintenance activities: post-closure & perpetual care frequency are equal*	

PCC-9.04.9 MSE Wall Maint.						$3.03 based on 6,600 LF for 6-cell scenario.	
MSE Wall Maint.	4200	LF	$3.03	$12,726	$12,726	4,200 LF of MSE wall	WM/Golder Guidance Document (12-1-10)
Subt - MSE Wall Maint.				**$12,726**	**$12,726**	*RMU-2 MSE Wall maintenance*	
(Subt: Assemb PCC-9.04.9)				**$12,726**	**$12,726**		

PCC-9.04: RMU-2 (4-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.04.10 Leachate System Mgmt						operation time = 8 hours/day x 5 days/week x 50 weeks/year = 2,000 hours	
Leachate Treatment	95889	gal	$0.0178	$1,707	$0	95,889 gals estimated annual leachate volume based average prediction 0-30 years post closure	unit price derived from AWTS O&M model
Leachate Treatment - Perpetual Care	19039	gal	$0.0178	$0	$339	19,039 perpetual care average years 31-60 Taken from RMU-2 2012 LeachGenMode	
Leach Treat Syst. Capital Repl Cost	0	LS	$17,642.00	$0	$0	$3,087 K div by 25 year life = $123,495/yr div by 7 facility units = $17,642 each (costs allocated to other 7 units at the f	DEC estimate of AWTS capital replacement costs @ 25 yrs
						The Cost for capital replacement of AWTS is already provided in the post closure estimate for 7 other units that generate leachate	
Laborer	24	hours	$39.00	$936	$936	2 hrs/mon x 12 mon/year = 24 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician	24	hours	$38.00	$912	$912	2 hrs/mon x 12 mon/year = 24 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Primary Leachate VOC Samp & Analysis	8.4	sample	$105.00	$882	$882	4 sumps x 1.05 per sump x 2.0 event/yr = 8.4 samples	Avg. of three lab quotes
Primary Leachate Metals Samp & Analysis	8.4	sample	$188.00	$1,579	$1,579	4 sumps x 1.05 per sump x 2.0 event/yr = 8.4 samples	Avg. of three lab quotes
Primary Leachate PCBs Samp & Anaylsis	8.4	sample	$133.33	$1,120	$1,120	4 sumps x 1.05 per sump x 2.0 event/yr = 8.4 samples	Avg. of three lab quotes
Secondary Leachate VOC Samp & Analysis	8.4	sample	$105.00	$882	$882	4 sumps x 1.05 per sump x 2.0 event/yr = 8.4 samples	Avg. of three lab quotes
Secondary Leachate Metals Samp & Analysis	4.2	sample	$188.00	$790	$790	4 sumps x 1.05 per sump = 1.0 event/yr = 4.2 samples	Avg. of three lab quotes
Secondary Leachate PP Organics Samp & Analysis	4.2	sample	$633.33	$2,660	$2,660	4 sumps x 1.05 per sump = 1.0 event/yr = 4.2 samples	Avg. of three lab quotes
Electrical Costs - Pumps	384.6	KWH	$0.086	$33	$33	343.7 hr/yr x 1.5 hp/hr x 0.746 kw/hp = 384.6 KWH	2004 DEC Rate * Implicit Deflator
Replacement of Main Pump T-150	0.2	pump	$14,425.00	$2,885	$2,885	1 pump per 5 years = 0.2 pumps	30 hp pump, site experience
Replacement of Secondary Pump T-150	0.0	pump	$14,425.00	$0	$0	1 pump per 5 years = 0.2 pumps	Pump not necessary in post closure
Replace Primary Sump Pumps	0.8	pump	$1,382.00	$1,106	$1,106	4 pumps x 20.0% pu/yr = 0.8 pumps	1.5 hp submersible pump, site experience
Replace Secondary Sump Pumps	0.6	pump	$850.00	$510	$510	4 pumps x 15.0% pu/yr = 0.6 pumps	4" subm pump, 0.5 hp, , site experience
Replacement of Pump Dischg Hose	1.4	hose	$211.54	$296	$296	1.4 pumps x 1 per pump = 1.4	DEC 2004 rate * deflator (2004-2010)
Disposal of Pumps/Hoses	14	CF	$12.45	$174	$174	1.4 pu/hos @ 10 CF/pump = 14 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Replacement of Piping - 2"/4"	3.2	LF	$53.25	$170	$170	640 LF @ 0.5% per year = 3.2 LF/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Piping - 2"/4"	1.1	CF	$12.45	$14	$14	3.2 LF @ 0.33 CF/LF = 1.1 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Replace Piping - 4"/8" & 6"/10"	21	LF	$73.50	$1,544	$1,544	4187 LF @ 0.5% per year = 21 LF/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Piping - 4"/8" & 6"/10"	10.5	CF	$12.45	$131	$131	21 LF @ 0.50 LF/drum = 10.5 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Pipe Cleaning - 8" diameter	2804	LF	$2.14	$6,001	$6,001	2,804 LF @ 1.0 events/yr = 2,804 LF	DEC 2004 rate * deflator (2004-2010)
Subt - Leachate Coll Syst Mgmt				**$24,331**	**$22,963**	*annual O&M costs plus capital replacement of treatment system, pumps, and piping*	
PCC-9.04.11 AWTS Operation						Shift operation of the AWTS for 12 months	no DEC estimate for this activity: DEC Estimate included in unit r
Subt - AWTS Operation				**$0**	**$0**	AWTS Operation - operation of AWTS for twelve (12) months during post closure or perpetual care of the site	
						The Cost for operation of AWTS is already provided in the post closure estimate for 7 other units that generate leachate	
PCC-9.04.12 Site Waters Treatment							
Subt - Site Waters Treatment				**$0**	**$0**	*The Cost for treatment of of site waters is already provided in the post closure estimate for 7 other units*	Labor included in PCC-1.7a
PCC-9.04.13 Batch Tank Qualification						2 Batch Qualification tanks prior to discharge to facultative ponds	To Meet LDR requirements
Subt - Batch Tank Qualification				**$0**	**$0**	*The Cost for tank qualifications is already provided in the post closure estimate for 7 other units*	Samples collected by lab technician
PCC-9.04.14 Pond Sampling & Analysis (Outfall 001)						production rate = 2.0 hours per composite sample for a three-person crew	SPDES PreQual Sampling of Outfall 001 prior to discharge
Batch Sampling Events						*1 events @ 3 samp/evnt= 3 samples*	sampling & analysis prior to pond discharge
Subt - Pond Sampling & Analysis				**$0**	**$0**	*The Cost for pond qualifications is already provided in the post closure estimate for 7 other units*	

PCC-9.04: RMU-2 (4-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.04.15 Pond S&A Certification & Report						one event per year for divers to check discharge pipe; one predischarge qualification report	
Subt - S&A Cert'n & Report				$0	$0	*diver(s) to check discharge pipe; also engineer's predischarge qualification report*	
						The Cost for pond qualifications report and diver inspections of outfall is already provided in the post closure estimate for 7 other units	
PCC-9.04.16 Empty (Pump) FAC Pond to Outfall 001						prod'n rate = 960,000 gals/day = 60,000 gals/hr = 1,000 gals/min per facility est @ 16 hrs/day O&M	Treated wastewater from all 7 units
FAC Pond 1/2 Inventory in Gallons		*gals*	*n/a*			45.8 *total hours* *req'd* *to pump*	& site waters
Subtotal - Pump FAC Pond 1/2				$0	$0	*transfer contents of FAC Pond to discharge pipe to Niagara River* (3,000 ft). The Cost for discharge to outfall is already provided in the post closure estimate for 7 other units	
(Subt: Assemb PCC-9.04.10 thru 9.04.16)				**$24,331**	**$22,963**	RMU-2 *share of annual O&M and capital costs for leachate collection & treatment: provided in post closure cost estimate for 7 other units at facility*	

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.04.17 N/A							
Subt - N/A				$0	$0		
PCC-9.04.18 N/A							
Subt - N/A				$0	$0		
PCC-9.04.19 N/A							
Subt - N/A				$0	$0		
(Subt: Assemb PCC-9.04.17 thru 9.04.19)				$0	$0	RMU-2 share of annual leachate transport costs - n/a, as leachate pumped directly to the AWTS	

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.04.20 Tank Assessments						sixteen (16) tanks requiring internal & external inspections once every five years by 1 PE + 2 Techs	
Internal & External Inspections						*16 tanks @ 5 yr inspect = 3.2 tnks/yr @ 7 areas = 0.5 tnks/yr*	
Subt - Tank Assessments				$0	$0	*inspection of 16 tanks*	
						The Cost for tank assessment is already provided in the post closure estimate for 7 other units	
PCC-9.04.21 Tank Assessments						thirty (32) tanks requiring only external inspections once every five years by 1 PE	
External Only Inspections						*30 tanks @ 5 yr inspect = 6.0 tnks/yr @ 7 areas = 0.9 tnks/yr*	
Subt - Tank Assessments				$0	$0	*inspection of 32 tanks*	
						The Cost for tank assessment is already provided in the post closure estimate for 7 other units	
(Subt: Assemb PCC-9.04.20 thru 9.04.21)				$0	$0	RMU-2 *share of annual tank assessment costs: post-closure & perpetual care frequency are equal*	

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.04.22 Replace Mon Well Pump							
Replace Mon Well Pumps	0.53	pump	$900.00	$477	$477	21 pumps @ 2.5% per year = 0.53 pumps/yr	Site experience third party costs
Technician	2.0	Hour	$38.00	$76	$76	2 hours per year	third party labor costs
Disposal of Pumps	0.53	CF	$12.45	$7	$7	0.53 pumps @ 1.0 CF/pump = 0.53 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Repair Mon Well Concrete Pads	0.53	pad	$131.50	$70	$70	21 pads @ 2.5% per year = 0.53 pads/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Well Surface Concrete	1.1	CF	$12.45	$14	$14	0.53 pads @ 2.0 CF/pad = 1.1 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Repair Mon Well Covers	0.53	each	$371.63	$197	$197	21 covers @ 2.5% per year = 0.53 covers/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Mon Well Covers	0.27	CF	$12.45	$3	$3	0.53 covers @ 0.5 CF/cover = 0.27 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Subt - Replace Mon Well Pumps				**$843**	**$843**	*monitoring well pump maintenance and replacement*	
(Subt: Assemb PCC-9.04.22)				**$843**	**$843**	*RMU-2 mon well pump maintenance & replacement: post-closure & perpetual care frequency are equal*	

PCC-9.04: RMU-2 (4-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.04.23 Drainage Ditch Repair						ditches estimated to be 10 feet in width	
RMU-2 Drainage Ditches						Perimeter Ditch + Drainage Tile System = 4,825 + 10,820 = 15,645 LF	*drainage ditches specific to RMU-2 unit*
Facility-wide Drainage Ditches						*22600 LF div by 8 units = 2825 LF* 0 LF for RMU-2	*drainage ditches in non-specific areas of facility*
RMU-2 Downchutes						*685 LF 26" pipe 266 LF 6" pipe*	
Drainage Ditch Repair	0.025	acre	$5,698.00	$142	$142	15,645 LF x 10 ft/LF = 2.45 acres @ 1.0% per year = 0.025 acres	unit price based upon $5,698/acre (RMU-1 Assembly 14.20)
Downchute Pipe Cleaning 26"	34.25	LF	$2.14	$73	$73	685 LF x 5.0% per year = 34.25 LF	DEC 2004 rate * deflator (2004-2010) for cleaning 8" dia pipe
Downchute Pipe Cleaning 6"	13.3	LF	$2.14	$28	$28	266 LF x 5.0% per year = 13.3 LF	DEC 2004 rate * deflator (2004-2010) for cleaning 8" dia pipe
Subt - Drainage Ditch Repair				**$244**	**$244**	*stormwater drainage ditch repair*	
						The cost of repair of facility-wide ditches is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.04.24 Drainage Ditch Cleaning						ditches estimated to be 10 feet wide; sediment estimated to be 4 inches deep.	
RMU-2 Drainage Ditches						10,672 LF	*drainage ditches specific to RMU-2 unit*
Facility-wide Drainage Ditches						*22600 LF div by 8 units = 2825 LF* 0 LF for RMU-2	*drainage ditches in non-specific areas of facility*
Drainage Ditch Sediment Cleaning	19.3	CY	$2.38	$46	$46	15,645 LF x 10.0 ft/LF x 0.333 feet (4")/27 = 1,931 CY @ 1%/yr = 19.3 CY	unit price based upon FAC Ponds 1/2 excavation (6.11)
Transportation of Ditch Sediment	6.5	miles	$3.25	$21	$21	26.1 tons @ 20 tons/load = 1.3 loads @ 5 miles per load = 6.5 miles	unit price based upon FAC Ponds 1/2 transportation (6.13)
Disposal of Ditch Sediment	26.1	ton	$35.00	$914	$914	19.3 CY @ 1.35 ton/CY = 26.1 tons	unit price based upon FAC Ponds 1/2 disposal (6.14)
Subt - Drainage Ditch Cleaning				**$981**	**$981**	*stormwater drainage ditch cleaning*	
						The cost of cleaning of facility-wide ditches is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.04.25 Basin Cleaning						sediment estimated to be 4 inches deep.	
Basin No. 1						*140625 SF div by 8 units = 17578 SF*	
Basin No. 2						*150000 SF div by 8 units = 18750 SF*	
Subt--Basin Cleaning				**$0**	**$0**	*facility stormwater basin cleaning*	
						The cost of cleaning of facility basins is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.04.26 Culvert Maint/Replace						average culvert = 40 feet in length and 18 inches in diameter; replace one 40-foot sections/year	
RMU-2 *Culverts*						*4 culverts x 40 feet long = 160 LF*	culverts specific to RMU-2 unit
Facility-wide Culverts						*20 culverts x 40 feet long = 800 LF div by 8 units =* 0 LF for RMU-2	*culverts in non-specific areas of facility*
Culvert Cleaning - 18" diameter avg	160	LF	$2.14	$342	$342	160 LF	DEC 2004 rate * deflator (2004-2010)
Repl Culvert - 18" diam avg (RMU-2)	40	LF	$11.61	$464	$464	160 LF @ 1 culvert/yr = 40 LF	DEC 2004 rate * deflator (2004-2010)
Repl Culv't - 18" diam avg (sitewide)	0	LF	$22.35	$0	$0	40.0 LF @ 1.00 culvert/yr = 40 LF 0 LF for RMU-2	DEC 2004 rate * deflator (2004-2010)
Replace Culvert - Ditch Excavation	30	CY	$2.96	$89	$89	40.0 LF x 0.75 CY/LF = 30 CY	DEC 2004 rate * deflator (2004-2010)
Replace Culvert - Bkfill/Compaction	30	CY	$3.86	$116	$116	30 CY	DEC 2004 rate * deflator (2004-2010)
Subt - Culvert Maint/Replacement				**$1,011**	**$1,011**	*culvert maintenance and replacement*	
						The cost of cleaning of maintaining facility-wide drainage is provided in post-closure estimate for 8 other units at the facility.	
(Subt: Assemb PCC-9.04.23 thru 9.04.26)				**$2,236**	**$2,236**	RMU-2 *storm drainage maintenance & replacement: post-closure & perpetual care frequency are equal*	

PCC-9.04: RMU-2 (4-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.04.27 Road Maint/Replace						gravel roads = 15 feet wide; asphalt roads = 20 feet wide	
RMU-2 *Gravel Roads*						*48425 LF x 15 feet wide/ 9 SF/SY = 8042 SY @ 2% per year = 160.8 SY*	
Facility-wide Asphalt Roads						*21120 LF x 20 feet wide = 422400 SF @ 1% per year =* 0 SF for RMU-2	*asphalt roads in non-specific areas of facility*
RMU-2 Gravel Road Repair	160.8	SY	$3.12	$502	$502	160.8 SY	DEC 2004 rate * deflator (2004-2010)
Facility-wide Asphalt Roads	0	SF	$1.35	$0	$0	4,224.0 SF div by 8 units = 528.0 SF 0 SF for RMU-2	DEC 2004 rate * deflator (2004-2010)
Subt - Road Maint/Replacement				**$502**	**$502**	*road maintenance and replacement*	
						The cost of cleaning of maintaining facility-wide roads is provided in post-closure estimate for 8 other units at the facility.	
(Subt: Assemb PCC-9.04.27)				**$502**	**$502**	*RMU-2 road maintenance & replacement*	

Total Non-Super hours 169.8

PCC-9.04.28 PPE Use/H&S Planning						Level C @ 10%; Mod Level C @ 15%; Level D @ 75% for tot non-supv hrs for all tasks; HASP @ 2.5% of non-supv hrs	
PPE Usage - Level D	15.4	days	$0.00	$0	$0	169.8 hours @ 8 hr/day = 21.2 days @ 75% "D" days = 15.9 days	75% of non-supv hrs in Level D (used facility price: $0/day)
PPE Usage - Mod Level C	3.1	days	$9.00	$28	$28	169.8 hours @ 8 hr/day = 21.2 days @ 15% "C" days = 3.2 days	15% of non-supv hrs in Mod Level C (used facility price: $9/day)
PPE Usage - Level C	2	days	$25.00	$50	$50	169.8 hours @ 8 hr/day = 21.2 days @ 10% "C" days = 2.1 days	10% of non-supv hrs in Level C (used facility price: $25/day)
Health & Safety Officer	4.2	hours	$75.00	$315	$315	169.8 hours @ 2.5% hr/hr = 4.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Subt - PPE Usage/H&S Planning				**$393**	**$393**		
PCC-9.04.29 Supervision							
Foreman	0	hours	$65.00	$0	$0	Included in Post-Closure cost estimates for other 7-units at the facility that generate leachate	loaded labor rate: loaded labor rate 2011 3rd party quote
Site Project Manager	0	hours	$75.00	$0	$0	Included in Gen'l Contractor G&A/Home Office indirect costs	loaded labor rate: loaded labor rate 2011 3rd party quote
Subtotal - Supervision				**$0**	**$0**		
(Subt: Assemb PCC-9.04.28 thru 9.04.29)				**$393**	**$393**	supervision, health & safety, and certification	

PCC 9.04 (4-Cells): RMU-2 Direct Cost				**$59,460**	**$49,917**

PCC-9.04: RMU-2 (4-Cells)

Total Cost Summary

Cost Category	Proposed Percent of Direct Cost	Proposed Annual Cost Post - Closure Period	Proposed Cost - Annual Perpetual Care	Cost Range
Direct Costs		$59,460	$49,917	
Plus Indirect Costs/Profit:				
Site Activity Management Costs	3.00%	$1,784	$1,497.50	Included in Gen'l Contractor G&A/Home Office (note: DEC uses 3%)
Gen'l Contractor G&A/Home Office	4.00%	$2,378	$1,997	5% for post-closure. (note: DEC uses 4%)
Pre-Construction Design Costs	1.00%	$595	$499.17	For post-closure, design costs minimal and included in Assb 6.21. (note: DEC uses 1%)
Engineering During Construction	1.00%	$595	$499.17	For post-closure, design costs minimal and included in Assb 6.21. (note: DEC uses 1%)
General Contractor Profit	6.00%	$3,568	$2,995	Contractor Profit included in unit rates & Gen' Cont G&A/Home Office (Note DEC adds 6%)
Indirect Costs & Profit	15.00%	$8,919	$7,488	
Subtotal - Direct/Indirect Costs		$68,379	$57,404	
Plus Contingency	15.00%	$10,257	$8,611	DEC uses 15% applied to total cost
Total - PCC-9.04: RMU-2 (4-Cells)		**$78,636**	**$66,015**	

RMU-2 Years of Post Closure — Years Since Closure: N/A — Post Closure Years Remaining: 30

Post Closure Costs Remaining Years		**$2,359,076**
Post Closure Costs 30-Years		**$2,359,076**

Liner Feet of MSE Wall

	Liner Feet	Cell #	Acres	Cummulative Acres
1-Cell Scenario (Cell 20)	1665	20	6.9	6.9
2-Cell Scenario (Cells 18,20)	2095	18	6.2	13.1
3-Cell Scenario (Cells 18,20,19)	3815	19	6.4	19.5
4-Cell Scenario (Cells 18,20,19,17)	4200	17	5.9	25.4
5-Cell Scenario (Cells 18,20,19,17,16)	5230	16	6.5	31.9
6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A	15	6.6	38.5
		Total Area	38.5	acres

Includes slope correction

PCC-9.05: RMU-2 (5-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References

RMU-2 Parameters - Area				31.9 acres =	154,396 SY = 1,389,546 SF =	1,389.5 MSF	31680 LF (6 Mi.) = total est'd perimeter fencing for eight (8) SLFs
RMU-2 Parameters - Fencing							0 LF = portion of perimeter fencing for RMU-2
Perimeter Ditch	6,035 linear feet	1200+600+500+670+585+560+560+500+600+260 = 6,035					
Drainage Tile System	7,728 linear feet	31.9 acres * 426 LF/acre = 13,589 LF					
MSE Wall	5,230 linear feet						

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.05.1 Annual Visual Inspections						make visual inspections and log results; two persons required	
Post-Closure							
Technician - Landfill	6.8	hours	$38.00	$258	$0	2 hrs/insp x 1.7 insp/year x 2 per crew = 6.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Landfill Leachate Syst	6.8	hours	$38.00	$258	$0	2 hrs/insp x 1.7 insp/year x 2 per crew = 6.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Perimeter Fencing	0	hours	$38.00	$0	$0	3 hrs/insp x 2.0 insp/year x 2 per crew/ 8 facility units = 1.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Storm Water Mgt Syst	7.2	hours	$38.00	$274	$0	2 hrs/insp x 1.8 insp/year x 2 per crew = 7.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - 25-Yr Storm Event	0	hours	$38.00	$0	$0	included above	this activity s/b included with annual storm water inspect'ns
Engineer - MSE Wall Inspection	16	hours	$130.00	$2,080	$0	16 hrs/insp x 1.0 insp/year x 1 per crew = 16.0 hours	
Subtotal - Annual Inspections				**$2,870**	**$0**	RMU-2 post-closure inspections	
Perpetual Care						Perpetual Care Frequencies according to Page 11 of Site-Wide and RMU-2 Post-Closure Plans	
Technician - Landfill	4.0	hours	$38.00	$0	$152	2 hrs/insp x 1.0 insp/year x 2 per crew = 4.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Landfill Leachate Syst	4.0	hours	$38.00	$0	$152	2 hrs/insp x 1.0 insp/year x 2 per crew = 4.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Perimeter Fencing	0.0	hours	$38.00	$0	$0	4 hrs/insp x 1.0 insp/year x 2 per crew/ 8 facility units = 1.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Storm Water Mgt Syst	4.2	hours	$38.00	$0	$160	2 hrs/insp x 1.04 insp/year x 2 per crew = 4.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - 25-Yr Storm Event	0.0	hours	$38.00	$0	$0	included above	this activity s/b included with annual storm water inspect'ns
Engineer - MSE Wall Inspection	16	hours	$130.00	$0	$2,080	16 hrs/insp x 1.0 insp/year x 1 per crew = 16.0 hours	
Subtotal - Annual Inspections Perp-Care				**$0**	**$2,544**	RMU-2 perpetual care inspections	
(Subt: Assemb PCC-9.05.1)				**$2,870**	**$2,544**	RMU-2 visual inspections. The Cost for facility fence inspection is already provided in the post closure estimate for 8 other units	

PCC-9.05.2 Perimeter Fence Maint.						one-eighth of total perimeter fencing allocated per SLF unit; 2% annual replacement projected	
Subt - Perimeter Fence Maint.				**$0**	**$0**	*The Cost for facility fence repair is already provided in the post closure estimate for 8 other units*	
(Subt: Assemb PCC-9.05.2)				**$0**	**$0**		

PCC-9.05.3 Maint. Benchmarks/Surv						Annual inspection only	
Maint of Benchmarks & Surveying	0	acres	$0.00	$0	$0	Included in PCC-9.05.1	
Subt - Benchmarks & Surveying				$0	$0		
(Subt: Assemb PCC-9.05.3)				**$0**	**$0**		

PCC-9.05: RMU-2 (5-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.05.4 Groundwater Monitoring						*sampling crew composed of two technicians; 21 monitoring wells*	
Monit'g Events & Samples/Event						*0.0 quart'ly + 40 semi-ann + 1.0 b-ann'l x 1.05 each = 42.5 samp*	*includes 5% QA sampling*
Post-Closure							
Technician	85	hours	$38.00	$3,230	$0	42.5 samps @ 1.0 hrs/samp x 2 per crew = 85 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	42.5	samp	$25.00	$1,063	$0	42.5 samps	bottles, shipping supplies
VOCs	42.5	samp	$105.00	$4,463	$0	42.5 samps	Average of three quotes
Subt - GW Monitoring				**$8,755**	**$0**	*post closure groundwater monitoring*	
Monit'g Events & Samples/Event						21 wells @ sample/5 years *1.05 each =* 4.4 samp/yr	
Perpetual Care						Perpetual care groundwater monitoring once every five years	
Technician	8.8	hours	$38.00	$0	$334	4.4 samps @ 1.0 hrs/samp x 2 per crew = 8.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	4.4	samp	$25.00	$0	$110	4.4 samples	bottles, shipping supplies
VOCs	4.4	samp	$105.00	$0	$462	4.4 samples	Average of three quotes
Subt - GW Monitoring				**$0**	**$906**	*perpetual care groundwater monitoring*	
PCC-9.05.5 Outfalls 002,003,004 SPDES Mon						production rate = 2 hours per sample for a one-person crew: each year of monitoring during closure	
Weekly Sampling Events						12 months = 52 weeks @ 3 outfalls @ 1 sample/OF = 156 samples	sampling & analysis according to SPDES Permit
Subt - SPDES Outfall Sampling & Analysis				**$0**	**$0**	*The Cost for facility stormwater discharge is already provided in the post closure estimate for 8 other units*	
PCC-9.05.6 Discharge Monitoring Report						Monthly Discharge Monitoring Reports	
Subt - Discharge Monitoring Report				**$0**	**$0**	submittal of SPDES Permit required Discharge Monitoring Report (DMR)	
						The Cost for facility stormwater discharge is already provided in the post closure estimate for 8 other units	
(Subt: Assemb PCC-9.05.4 thru 9.05.6)				**$8,755**	**$906**	*RMU-2 groundwater & stormwater monitoring activities*	
PCC-9.05.7 Landfill Cover Maint.							
Replacement of Cover	0.1595	acre	$20,973.33	$3,345	$3,345	31.9 acre @ 0.5% per year = 0.1595 acres/yr	unit price based upon vegetation, topsoil, from RMU-1,
Subt - Landfill Cover Maint.				**$3,345**	**$3,345**	*RMU-2 upper cap maintenance and replacement*	Assemblies 14.17 thru 14.18
PCC-9.05.8 Mowing/Grooming							
Mowing	1389.5	MSF	$3.21	$4,465	$4,465	1389.5 MSF @ 1.0 per year = 1389.5 MSF	DEC 2004 rate * deflator (2004-2010)
Fertilizing	277.9	MSF	$3.82	$1,061	$1,061	1389.5 MSF @ 1.0 per 5.0 years = 277.9 MSF	DEC 2004 rate * deflator (2004-2010)
Subt - Mowing/Grooming				**$5,526**	**$5,526**	RMU-2 *mowing and fertilizing*	
(Subt: Assemb PCC-9.05.7 thru 9.05.8)				**$8,871**	**$8,871**	*RMU-2 cap maintenance activities: post-closure & perpetual care frequency are equal*	
PCC-9.05.9 MSE Wall Maint.						$3.03 based on 6,600 LF for 6-cell scenario.	
MSE Wall Maint.	5230	LF	$3.03	$15,847	$15,847	4,200 LF of MSE wall	WM/Golder Guidance Document (12-1-10)
Subt - MSE Wall Maint.				**$15,847**	**$15,847**	*RMU-2 MSE Wall maintenance*	
(Subt: Assemb PCC-9.05.9)				**$15,847**	**$15,847**		

PCC-9.05: RMU-2 (5-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.05.10 Leachate System Mgmt						operation time = 8 hours/day x 5 days/week x 50 weeks/year = 2,000 hours	
Leachate Treatment	120427	gal	$0.0178	$2,144	$0	120,427 gals estimated annual leachate volume based average prediction 0-30 years post closure	unit price derived from AWTS O&M model
Leachate Treatment - Perpetual Care	23911	gal	$0.0178	$0	$426	23,911 perpetual care average years 31-60 Taken from RMU-2 2012 LeachGenMode	
Leach Treat Syst. Capital Repl Cost	0	LS	$17,642.00	$0	$0	$3,087 K div by 25 year life = $123,495/yr div by 7 facility units = $17,642 each (costs allocated to other 7 units at the fac	DEC estimate of AWTS capital replacement costs @ 25 yrs
						The Cost for capital replacement of AWTS is already provided in the post closure estimate for 7 other units that generate leachate	
Laborer	48	hours	$39.00	$1,872	$1,872	4 hrs/mon x 12 mon/year = 48 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician	48	hours	$38.00	$1,824	$1,824	4 hrs/mon x 12 mon/year = 48 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Primary Leachate VOC Samp & Analysis	10.5	sample	$105.00	$1,103	$1,103	5 sumps x 1.05 per sump x 2.0 event/yr = 10.5 samples	Avg. of three lab quotes
Primary Leachate Metals Samp & Analysis	10.5	sample	$188.00	$1,974	$1,974	5 sumps x 1.05 per sump x 2.0 event/yr = 10.5 samples	Avg. of three lab quotes
Primary Leachate PCBs Samp & Anaylsis	10.5	sample	$133.33	$1,400	$1,400	5 sumps x 1.05 per sump x 2.0 event/yr = 10.5 samples	Avg. of three lab quotes
Secondary Leachate VOC Samp & Analysis	10.5	sample	$105.00	$1,103	$1,103	5 sumps x 1.05 per sump x 2.0 event/yr = 10.5 samples	Avg. of three lab quotes
Secondary Leachate Metals Samp & Analysis	5.3	sample	$188.00	$996	$996	5 sumps x 1.05 per sump = 1.0 event/yr = 5.3 samples	Avg. of three lab quotes
Secondary Leachate PP Organics Samp & Analysis	5.3	sample	$633.33	$3,357	$3,357	5 sumps x 1.05 per sump = 1.0 event/yr = 5.3 samples	Avg. of three lab quotes
Electrical Costs - Pumps	384.6	KWH	$0.086	$33	$33	343.7 hr/yr x 1.5 hp/hr x 0.746 kw/hp = 384.6 KWH	2004 DEC Rate * Implicit Deflator
Replacement of Main Pump T-150	0.2	pump	$14,425.00	$2,885	$2,885	1 pump per 5 years = 0.2 pumps	30 hp pump, site experience
Replacement of Secondary Pump T-150	0.0	pump	$14,425.00	$0	$0	1 pump per 5 years = 0.2 pumps	Pump not necessary in post closure
Replace Primary Sump Pumps	1	pump	$1,382.00	$1,382	$1,382	5 pumps x 20.0% pu/yr = 1 pumps	1.5 hp submersible pump, site experience
Replace Secondary Sump Pumps	0.75	pump	$850.00	$638	$638	5 pumps x 15.0% pu/yr = 0.75 pumps	4" subm pump, 0.5 hp, , site experience
Replacement of Pump Dischg Hose	1.75	hose	$211.54	$370	$370	1.75 pumps x 1 per pump = 1.75	DEC 2004 rate * deflator (2004-2010)
Disposal of Pumps/Hoses	17.5	CF	$12.45	$218	$218	1.75 pu/hos @ 10 CF/pump = 17.5 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Replacement of Piping - 2"/4"	4	LF	$53.25	$213	$213	800 LF @ 0.5% per year = 4 LF/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Piping - 2"/4"	1.34	CF	$12.45	$17	$17	4 LF @ 0.33 CF/LF = 1.34 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Replace Piping - 4"/8" & 6"/10"	26.2	LF	$73.50	$1,926	$1,926	5,234 LF @ 0.5% per year = 26.2 LF/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Piping - 4"/8" & 6"/10"	13.1	CF	$12.45	$163	$163	26.2 LF @ 0.50 LF/drum = 13.1 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Pipe Cleaning - 8" diameter	3504.2	LF	$2.14	$7,499	$7,499	3,504.2 LF @ 1.0 events/yr = 3,504.2 LF	DEC 2004 rate * deflator (2004-2010)
Subt - Leachate Coll Syst Mgmt				**$31,115**	**$29,397**	*annual O&M costs plus capital replacement of treatment system, pumps, and piping*	
PCC-9.05.11 AWTS Operation						Shift operation of the AWTS for 12 months	no DEC estimate for this activity: DEC Estimate included in un
Subt - AWTS Operation				**$0**	**$0**	AWTS Operation - operation of AWTS for twelve (12) months during post closure or perpetual care of the site	
						The Cost for operation of AWTS is already provided in the post closure estimate for 7 other units that generate leachate	
PCC-9.05.12 Site Waters Treatment							
Subt - Site Waters Treatment				**$0**	**$0**	*The Cost for treatment of of site waters is already provided in the post closure estimate for 7 other units*	Labor included in PCC-1.7a
PCC-9.05.13 Batch Tank Qualification						2 Batch Qualification tanks prior to discharge to facultative ponds	To Meet LDR requirements
Subt - Batch Tank Qualification				**$0**	**$0**	*The Cost for tank qualifications is already provided in the post closure estimate for 7 other units*	Samples collected by lab technician
PCC-9.05.14 Pond Sampling & Analysis (Outfall 001)						production rate = 2.0 hours per composite sample for a three-person crew	SPDES PreQual Sampling of Outfall 001 prior to discharge
Subt - Pond Sampling & Analysis				**$0**	**$0**	*The Cost for pond qualifications is already provided in the post closure estimate for 7 other units*	

PCC-9.05: RMU-2 (5-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.05.15 Pond S&A Certification & Report						one event per year for divers to check discharge pipe; one predischarge qualification report	
Subt - S&A Cert'n & Report				$0	$0	*diver(s) to check discharge pipe; also engineer's predischarge qualification report*	Fac Pond 8 out of service empty
						The Cost for pond qualifications report and diver inspections of outfall is already provided in the post closure estimate for 7 other units	
PCC-9.05.16 Empty (Pump) FAC Pond to Outfall 001						prod'n rate = 960,000 gals/day = 60,000 gals/hr = 1,000 gals/min per facility est @ 16 hrs/day O&M	Treated wastewater from all 7 units
FAC Pond 1/2 Inventory in Gallons		*gals*	*n/a*			45.8 *total hours req'd to pump*	& site waters
Subtotal - Pump FAC Pond 1/2				$0	$0	*transfer contents of FAC Pond to discharge pipe to Niagara River* (3,000 ft). The Cost for discharge to outfall is already provided in the post closure estimate for 7 other units	
(Subt: Assemb PCC-9.05.10 thru 9.05.16)				**$31,115**	**$29,397**	RMU-2 *share of annual O&M and capital costs for leachate collection & treatment: provided in post closure cost estimate for 7 other units at facility*	
PCC-9.05.17 N/A							
Subt - N/A				$0	$0		
PCC-9.05.18 N/A							
Subt - N/A				$0	$0		
PCC-9.05.19 N/A							
Subt - N/A				$0	$0		
(Subt: Assemb PCC-9.05.17 thru 9.05.19)				$0	$0	RMU-2 share of annual leachate transport costs - n/a, as leachate pumped directly to the AWTS	
PCC-9.05.20 Tank Assessments						sixteen (16) tanks requiring internal & external inspections once every five years by 1 PE + 2 Techs	
Internal & External Inspections						*16 tanks @ 5 yr inspect = 3.2 tnks/yr @ 7 areas = 0.5 tnks/yr*	
Subt - Tank Assessments				$0	$0	*inspection of 16 tanks*	
						The Cost for tank assessment is already provided in the post closure estimate for 7 other units	
PCC-9.05.21 Tank Assessments						thirty (32) tanks requiring only external inspections once every five years by 1 PE	
External Only Inspections						*30 tanks @ 5 yr inspect = 6.0 tnks/yr @ 7 areas = 0.9 tnks/yr*	
Subt - Tank Assessments				$0	$0	*inspection of 32 tanks*	
						The Cost for tank assessment is already provided in the post closure estimate for 7 other units	
(Subt: Assemb PCC-9.05.20 thru 9.05.21)				$0	$0	RMU-2 *share of annual tank assessment costs: post-closure & perpetual care frequency are equal*	
PCC-9.05.22 Replace Mon Well Pump							
Replace Mon Well Pumps	0.53	pump	$900.00	$477	$477	21 pumps @ 2.5% per year = 0.53 pumps/yr	Site experience third party costs
Technician	2.0	Hour	$38.00	$76	$76	2 hours per year	third party labor costs
Disposal of Pumps	0.53	CF	$12.45	$7	$7	0.53 pumps @ 1.0 CF/pump = 0.53 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Repair Mon Well Concrete Pads	0.53	pad	$131.50	$70	$70	21 pads @ 2.5% per year = 0.53 pads/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Well Surface Concrete	1.1	CF	$12.45	$14	$14	0.53 pads @ 2.0 CF/pad = 1.1 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Repair Mon Well Covers	0.53	each	$371.63	$197	$197	21 covers @ 2.5% per year = 0.53 covers/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Mon Well Covers	0.27	CF	$12.45	$3	$3	0.53 covers @ 0.5 CF/cover = 0.27 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Subt - Replace Mon Well Pumps				**$843**	**$843**	*monitoring well pump maintenance and replacement*	
(Subt: Assemb PCC-9.05.22)				**$843**	**$843**	*RMU-2 mon well pump maintenance & replacement: post-closure & perpetual care frequency are equal*	

PCC-9.05: RMU-2 (5-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.05.23 Drainage Ditch Repair						ditches estimated to be 10 feet in width	
RMU-2 Drainage Ditches						Perimeter Ditch + Drainage Tile System = 6,035 + 13,589 = 19,624 LF	drainage ditches specific to RMU-2 unit
Facility-wide Drainage Ditches						*22600 LF div by 8 units = 2825 LF* 0 LF for RMU-2	*drainage ditches in non-specific areas of facility*
RMU-2 Downchutes						*685 LF 26" pipe 266 LF 6" pipe*	
Drainage Ditch Repair	0.045	acre	$5,698.00	$256	$256	19,624 LF x 10 ft/LF = 4.5 acres @ 1.0% per year = 0.045 acres	unit price based upon $5,698/acre (RMU-1 Assembly 14.20)
Downchute Pipe Cleaning 26"	34.25	LF	$2.14	$73	$73	685 LF x 5.0% per year = 34.25 LF	DEC 2004 rate * deflator (2004-2010) for cleaning 8" dia pipe
Downchute Pipe Cleaning 6"	13.3	LF	$2.14	$28	$28	266 LF x 5.0% per year = 13.3 LF	DEC 2004 rate * deflator (2004-2010) for cleaning 8" dia pipe
Subt - Drainage Ditch Repair				**$358**	**$358**	*stormwater drainage ditch repair*	
						The cost of repair of facility-wide ditches is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.05.24 Drainage Ditch Cleaning						ditches estimated to be 10 feet wide; sediment estimated to be 4 inches deep.	
RMU-2 Drainage Ditches						13,763 LF	drainage ditches specific to RMU-2 unit
Facility-wide Drainage Ditches						*22600 LF div by 8 units = 2825 LF* 0 LF for RMU-2	*drainage ditches in non-specific areas of facility*
Drainage Ditch Sediment Cleaning	24.2	CY	$2.38	$58	$58	19,624 LF x 10.0 ft/LF x 0.333 feet (4")/27 = 2,422 CY @ 1%/yr = 24.2 CY	unit price based upon FAC Ponds 1/2 excavation (6.11)
Transportation of Ditch Sediment	8.2	miles	$3.25	$27	$27	32.7 tons @ 20 tons/load = 1.63 loads @ 5 miles per load = 8.2 miles	unit price based upon FAC Ponds 1/2 transportation (6.13)
Disposal of Ditch Sediment	32.7	ton	$35.00	$1,145	$1,145	24.2 CY @ 1.35 ton/CY = 32.7 tons	unit price based upon FAC Ponds 1/2 disposal (6.14)
Subt - Drainage Ditch Cleaning				**$1,229**	**$1,229**	*stormwater drainage ditch cleaning*	
						The cost of cleaning of facility-wide ditches is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.05.25 Basin Cleaning						sediment estimated to be 4 inches deep.	
Basin No. 1						*140625 SF div by 8 units = 17578 SF*	
Basin No. 2						*150000 SF div by 8 units = 18750 SF*	
Subt--Basin Cleaning				**$0**	**$0**	*facility stormwater basin cleaning*	
						The cost of cleaning of facility basins is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.05.26 Culvert Maint/Replace						average culvert = 40 feet in length and 18 inches in diameter; replace one 40-foot sections/year	
RMU-2 *Culverts*						*5 culverts x 40 feet long = 200 LF*	culverts specific to RMU-2 unit
Facility-wide Culverts						*20 culverts x 40 feet long = 800 LF div by 8 units =* 0 LF for RMU-2	*culverts in non-specific areas of facility*
Culvert Cleaning - 18" diameter avg	200	LF	$2.14	$428	$428	200 LF	DEC 2004 rate * deflator (2004-2010)
Repl Culvert - 18" diam avg (RMU-2)	40	LF	$11.61	$464	$464	200 LF @ 1 culvert/yr = 40 LF	DEC 2004 rate * deflator (2004-2010)
Repl Culv't - 18" diam avg (sitewide)	0	LF	$22.35	$0	$0	40.0 LF @ 1.00 culvert/yr = 40 LF 0 LF for RMU-2	DEC 2004 rate * deflator (2004-2010)
Replace Culvert - Ditch Excavation	30	CY	$2.96	$89	$89	40.0 LF x 0.75 CY/LF = 30 CY	DEC 2004 rate * deflator (2004-2010)
Replace Culvert - Bkfill/Compaction	30	CY	$3.86	$116	$116	30 CY	DEC 2004 rate * deflator (2004-2010)
Subt - Culvert Maint/Replacement				**$1,097**	**$1,097**	*culvert maintenance and replacement*	
						The cost of cleaning of maintaining facility-wide drainage is provided in post-closure estimate for 8 other units at the facility.	
(Subt: Assemb PCC-9.05.23 thru 9.05.26)				**$2,684**	**$2,684**	RMU-2 *storm drainage maintenance & replacement: post-closure & perpetual care frequency are equal*	

PCC-9.05: RMU-2 (5-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.05.27 Road Maint/Replace						gravel roads = 15 feet wide; asphalt roads = 20 feet wide	
RMU-2 *Gravel Roads*						*6035 LF x 15 feet wide/ 9 SF/SY = 10058 SY @ 2% per year = 201.2 SY*	
Facility-wide Asphalt Roads						*21120 LF x 20 feet wide = 422400 SF @ 1% per year =* 0 SF for RMU-2	*asphalt roads in non-specific areas of facility*
RMU-2 Gravel Road Repair	201.2	SY	$3.12	$628	$628	201.2 SY	DEC 2004 rate * deflator (2004-2010)
Facility-wide Asphalt Roads	0	SF	$1.35	$0	$0	4,224.0 SF div by 8 units = 528.0 SF 0 SF for RMU-2	DEC 2004 rate * deflator (2004-2010)
Subt - Road Maint/Replacement				**$628**	**$628**	*road maintenance and replacement*	
						The cost of cleaning of maintaining facility-wide roads is provided in post-closure estimate for 8 other units at the facility.	
(Subt: Assemb PCC-9.05.27)				**$628**	**$628**	*RMU-2 road maintenance & replacement*	

Total Non-Super hours 219.8

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.05.28 PPE Use/H&S Planning						Level C @ 10%; Mod Level C @ 15%; Level D @ 75% for tot non-supv hrs for all tasks; HASP @ 2.5% of non-supv hrs	
PPE Usage - Level D	20.6	days	$0.00	$0	$0	219.8 hours @ 8 hr/day = 27.5 days @ 75% "D" days = 20.6 days	75% of non-supv hrs in Level D (used facility price: $0/day)
PPE Usage - Mod Level C	4.1	days	$9.00	$37	$37	219.8 hours @ 8 hr/day = 27.5 days @ 15% "C" days = 4.1 days	15% of non-supv hrs in Mod Level C (used facility price: $9/da
PPE Usage - Level C	2.8	days	$25.00	$70	$70	219.8 hours @ 8 hr/day = 27.5 days @ 10% "C" days = 2.8 days	10% of non-supv hrs in Level C (used facility price: $25/day)
Health & Safety Officer	5.5	hours	$75.00	$413	$413	219.8 hours @ 2.5% hr/hr = 5.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Subt - PPE Usage/H&S Planning				**$519**	**$519**		
PCC-9.05.29 Supervision							
Foreman	0	hours	$65.00	$0	$0	Included in Post-Closure cost estimates for other 7-units at the facility that generate leachate	loaded labor rate: loaded labor rate 2011 3rd party quote
Site Project Manager	0	hours	$75.00	$0	$0	Included in Gen'l Contractor G&A/Home Office indirect costs	loaded labor rate: loaded labor rate 2011 3rd party quote
Subtotal - Supervision				**$0**	**$0**		
(Subt: Assemb PCC-9.05.28 thru 9.05.29)				**$519**	**$519**	supervision, health & safety, and certification	

PCC 9.05 (5-Cells): RMU-2 Direct Cost				**$72,133**	**$62,239**

PCC-9.05: RMU-2 (5-Cells)

Total Cost Summary

Cost Category	Proposed Percent of Direct Cost	Proposed Annual Cost Post - Closure Period	Proposed Cost - Annual Perpetual Care	Cost Range
Direct Costs		$72,133	$62,239	
Plus Indirect Costs/Profit:				
Site Activity Management Costs	3.00%	$2,164	$1,867.18	Included in Gen'l Contractor G&A/Home Office (note: DEC uses 3%)
Gen'l Contractor G&A/Home Office	4.00%	$2,885	$2,490	5% for post-closure. (note: DEC uses 4%)
Pre-Construction Design Costs	1.00%	$721	$622.39	For post-closure, design costs minimal and included in Assb 6.21. (note: DEC uses 1%)
Engineering During Construction	1.00%	$721	$622.39	For post-closure, design costs minimal and included in Assb 6.21. (note: DEC uses 1%)
General Contractor Profit	6.00%	$4,328	$3,734	Contractor Profit included in unit rates & Gen' Cont G&A/Home Office (Note DEC adds 6%)
Indirect Costs & Profit	15.00%	$10,820	$9,336	
Subtotal - Direct/Indirect Costs		$82,953	$71,575	
Plus Contingency	15.00%	$12,443	$10,736	DEC uses 15% applied to total cost
Total - PCC-9.05: RMU-2 (5-Cells)		**$95,396**	**$82,312**	

RMU-2 Years of Post Closure — Years Since Closure: N/A — Post Closure Years Remaining: 30

Post Closure Costs Remaining Years	**$2,861,869**
Post Closure Costs 30-Years	**$2,861,869**

Liner Feet of MSE Wall

Scenario	Liner Feet
1-Cell Scenario (Cell 20)	1665
2-Cell Scenario (Cells 18,20)	2095
3-Cell Scenario (Cells 18,20,19)	3815
4-Cell Scenario (Cells 18,20,19,17)	4200
5-Cell Scenario (Cells 18,20,19,17,16)	5230
6-Cell Scenario (Cells 18,20,19,17,16,15)	N/A

Cell #	Acres	Cummulative Acres
20	6.9	6.9
18	6.2	13.1
19	6.4	19.5
17	5.9	25.4
16	6.5	31.9
15	6.6	38.5
Total Area	38.5	acres

Includes slope correction

PCC-9.06: RMU-2 (6-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References

RMU-2 Parameters - Area 38.5 acres = 186,340 SY = 1,677,060 SF = 1677 MSF 31680 LF (6 Mi.) = total est'd perimeter fencing for eight (8) SLFs
RMU-2 Parameters - Fencing 0 LF = portion of perimeter fencing for RMU-2
Perimeter Ditch 6,500 linear feet
Drainage Tile System 16,400 linear feet 16,400/38.5 = 426 LF/acre
MSE Wall 6,600 linear feet

PCC-9.06.1 Annual Visual Inspections						make visual inspections and log results; two persons required	
Post-Closure							
Technician - Landfill	6.8	hours	$38.00	$258	$0	2 hrs/insp x 1.7 insp/year x 2 per crew = 6.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Landfill Leachate Syst	6.8	hours	$38.00	$258	$0	2 hrs/insp x 1.7 insp/year x 2 per crew = 6.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Perimeter Fencing	0	hours	$38.00	$0	$0	3 hrs/insp x 2.0 insp/year x 2 per crew/ 8 facility units = 1.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Storm Water Mgt Syst	7.2	hours	$38.00	$274	$0	2 hrs/insp x 1.8 insp/year x 2 per crew = 7.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - 25-Yr Storm Event	0	hours	$38.00	$0	$0	included above	this activity s/b included with annual storm water inspect'ns
Engineer - MSE Wall Inspection	18	hours	$130.00	$2,340	$0	18 hrs/insp x 1.0 insp/year x 1 per crew = 18.0 hours	
Subtotal - Annual Inspections				**$3,130**	**$0**	RMU-2 post-closure inspections	
Perpetual Care						Perpetual Care Frequencies according to Page 11 of Site-Wide and RMU-2 Post-Closure Plans	
Technician - Landfill	4.0	hours	$38.00	$0	$152	2 hrs/insp x 1.0 insp/year x 2 per crew = 4.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Landfill Leachate Syst	4.0	hours	$38.00	$0	$152	2 hrs/insp x 1.0 insp/year x 2 per crew = 4.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Perimeter Fencing	0.0	hours	$38.00	$0	$0	4 hrs/insp x 1.0 insp/year x 2 per crew/ 8 facility units = 1.0 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - Storm Water Mgt Syst	4.2	hours	$38.00	$0	$160	2 hrs/insp x 1.04 insp/year x 2 per crew = 4.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician - 25-Yr Storm Event	0.0	hours	$38.00	$0	$0	included above	this activity s/b included with annual storm water inspect'ns
Engineer - MSE Wall Inspection	18	hours	$130.00	$0	$2,340	18 hrs/insp x 1.0 insp/year x 1 per crew = 18.0 hours	
Subtotal - Annual Inspections Perp-Care				**$0**	**$2,804**	RMU-2 perpetual care inspections	
(Subt: Assemb PCC-9.06.1)				**$3,130**	**$2,804**	RMU-2 visual inspections. The Cost for facility fence inspection is already provided in the post closure estimate for 8 other units	

PCC-9.06.2 Perimeter Fence Maint.						one-eighth of total perimeter fencing allocated per SLF unit; 2% annual replacement projected	
Subt - Perimeter Fence Maint.				**$0**	**$0**	*The Cost for facility fence repair is already provided in the post closure estimate for 8 other units*	
(Subt: Assemb PCC-9.06.2)				**$0**	**$0**		

PCC-9.06.3 Maint. Benchmarks/Surv						Annual inspection only	
Subt - Benchmarks & Surveying				$0	$0		
(Subt: Assemb PCC-9.06.3)				**$0**	**$0**		

PCC-9.06: RMU-2 (6-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.06.4 Groundwater Monitoring						*sampling crew composed of two technicians; 29 monitoring wells*	
Monit'g Events & Samples/Event						*0.0 quart'ly + 58.0 semi-ann + 1.0 b-ann'l x 1.05 each = 61.4 samp*	*includes 5% QA sampling*
Post-Closure							
Technician	122.8	hours	$38.00	$4,666	$0	61.4 samps @ 1.0 hrs/samp x 2 per crew = 122.8 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	61.4	samp	$25.00	$1,535	$0	61.4 samps	bottles, shipping supplies
VOCs	61.4	samp	$105.00	$6,447	$0	61.4 samps	Average of three quotes
Subt - GW Monitoring				**$12,648**	**$0**	*post closure groundwater monitoring*	
Monit'g Events & Samples/Event						29.0 wells @ sample/5 years *1.05 each =* 6.1 samp/yr	
Perpetual Care						Perpetual care groundwater monitoring once every five years	
Technician	12.2	hours	$38.00	$0	$464	6.1 samps @ 1.0 hrs/samp x 2 per crew = 12.2 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Sampling Supplies	6.1	samp	$25.00	$0	$153	6.1 samples	bottles, shipping supplies
VOCs	6.1	samp	$105.00	$0	$641	6.1 samples	Average of three quotes
Subt - GW Monitoring				**$0**	**$1,257**	*perpetual care groundwater monitoring*	
PCC-9.06.5 Outfalls 002,003,004 SPDES Mon						production rate = 2 hours per sample for a one-person crew: each year of monitoring during closure	
Weekly Sampling Events						12 months = 52 weeks @ 3 outfalls @ 1 sample/OF = 156 samples	sampling & analysis according to SPDES Permit
Subt - SPDES Outfall Sampling & Analysis				**$0**	**$0**	*The Cost for facility stormwater discharge is already provided in the post closure estimate for 8 other units*	
PCC-9.06.6 Discharge Monitoring Report						Monthly Discharge Monitoring Reports	
Subt - Discharge Monitoring Report				**$0**	**$0**	submittal of SPDES Permit required Discharge Monitoring Report (DMR)	
						The Cost for facility stormwater discharge is already provided in the post closure estimate for 8 other units	
(Subt: Assemb PCC-9.06.4 thru 9.06.6)				**$12,648**	**$1,257**	*RMU-2 groundwater & stormwater monitoring activities*	
PCC-9.06.7 Landfill Cover Maint.							
Replacement of Cover	0.1925	acre	$20,973.33	$4,037	$4,037	38.5 acre @ 0.5% per year = 0.1925 acres/yr	unit price based upon vegetation, topsoil, from RMU-1,
Subt - Landfill Cover Maint.				**$4,037**	**$4,037**	*RMU-2 upper cap maintenance and replacement*	Assemblies 14.17 thru 14.18
PCC-9.06.8 Mowing/Grooming							
Mowing	1677.0	MSF	$3.21	$5,388	$5,388	1,677 MSF @ 1.0 per year = 1,6777 MSF	DEC 2004 rate * deflator (2004-2010)
Fertilizing	335.4	MSF	$3.82	$1,281	$1,281	1,677 MSF @ 1.0 per 5.0 years = 335.4 MSF	DEC 2004 rate * deflator (2004-2010)
Subt - Mowing/Grooming				**$6,669**	**$6,669**	RMU-2 *mowing and fertilizing*	
(Subt: Assemb PCC-9.06.7 thru 9.06.8)				**$10,707**	**$10,707**	*RMU-2 cap maintenance activities: post-closure & perpetual care frequency are equal*	
PCC-9.06.9 MSE Wall Maint.						Annual Inspections and annual repair and maintenance = $3.03/LF.	
MSE Wall Maint.	6600	LF	$3.03	$19,998	$19,998	6,600 LF of MSE wall	WM/Golder Guidance Document (12-1-10)
Subt - MSE Wall Maint.				**$19,998**	**$19,998**	*RMU-2 MSE Wall maintenance*	
(Subt: Assemb PCC-9.06.9)				**$19,998**	**$19,998**		

PCC-9.06: RMU-2 (6-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.06.10 Leachate System Mgmt						operation time = 8 hours/day x 5 days/week x 50 weeks/year = 2,000 hours	
Leachate Treatment	140624.2	gal	$0.0178	$2,503	$0	140,624.2 gals estimated annual leachate volume based average prediction 0-30 years post closure	unit price derived from AWTS O&M model
Leachate Treatment - Perpetual Care	27921.3	gal	$0.0178	$0	$497	27,921.3 perpetual care average years 31-60 Taken from RMU-2 2012 LeachGenModel	
Leach Treat Syst. Capital Repl Cost	0	LS	$17,642.00	$0	$0	$3,087 K div by 25 year life = $123,495/yr div by 7 facility units = $17,642 each (costs allocated to other 7 units at the facility	DEC estimate of AWTS capital replacement costs @ 25 yrs
						The Cost for capital replacement of AWTS is already provided in the post closure estimate for 7 other units that generate leachate	
Laborer	48.0	hours	$39.00	$1,872	$1,872	4 hrs/mon x 12 mon/year = 48 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Technician	48.0	hours	$38.00	$1,824	$1,824	4 hrs/mon x 12 mon/year = 48 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Primary Leachate VOC Samp & Analysis	21.0	sample	$105.00	$2,205	$2,205	6 sumps x 1.05 per sump x 2.0 event/yr = 12.6 samples	Avg. of three lab quotes
Primary Leachate Metals Samp & Analysis	21.0	sample	$188.00	$3,948	$3,948	6 sumps x 1.05 per sump x 2.0 event/yr = 12.6 samples	Avg. of three lab quotes
Primary Leachate PCBs Samp & Anaylsis	21.0	sample	$133.33	$2,800	$2,800	6 sumps x 1.05 per sump x 2.0 event/yr = 12.6 samples	Avg. of three lab quotes
Secondary Leachate VOC Samp & Analysis	21.0	sample	$105.00	$2,205	$2,205	6 sumps x 1.05 per sump x 2.0 event/yr = 12.6 samples	Avg. of three lab quotes
Secondary Leachate Metals Samp & Analysis	10.5	sample	$188.00	$1,974	$1,974	6 sumps x 1.05 per sump = 1.0 event/yr = 6.3 samples	Avg. of three lab quotes
Secondary Leachate PP Organics Samp & Analysis	10.5	sample	$633.33	$6,650	$6,650	6 sumps x 1.05 per sump = 1.0 event/yr = 6.3 samples	Avg. of three lab quotes
Electrical Costs - Pumps	384.6	KWH	$0.086	$33	$33	343.7 hr/yr x 1.5 hp/hr x 0.746 kw/hp = 384.6 KWH	2004 DEC Rate * Implicit Deflator
Replacement of Main Pump T-150	0.2	pump	$14,425.00	$2,885	$2,885	1 pump per 5 years = 0.2 pumps	30 hp pump, site experience
Replacement of Secondary Pump T-150	0.0	pump	$14,425.00	$0	$0	1 pump per 5 years = 0.2 pumps	Pump not necessary in post closure
Replace Primary Sump Pumps	1.2	pump	$1,382.00	$1,658	$1,658	6 pumps x 20.0% pu/yr = 1.2 pumps	1.5 hp submersible pump, site experience
Replace Secondary Sump Pumps	0.9	pump	$850.00	$765	$765	6 pumps x 15.0% pu/yr = 0.9 pumps	4" subm pump, 0.5 hp, , site experience
Replacement of Pump Dischg Hose	2.1	hose	$211.54	$444	$444	2.1 pumps x 1 per pump = 2.1 hoses	DEC 2004 rate * deflator (2004-2010)
Disposal of Pumps/Hoses	21.0	CF	$12.45	$261	$261	2.1 pu/hos @ 10 CF/pump = 21 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Replacement of Piping - 2"/4"	4.8	LF	$53.25	$256	$256	960 LF @ 0.5% per year = 4.8 LF/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Piping - 2"/4"	1.6	CF	$12.45	$20	$20	4.8 LF @ 0.33 CF/LF = 1.6 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Replace Piping - 4"/8" & 6"/10"	31.4	LF	$73.50	$2,308	$2,308	6,280 LF @ 0.5% per year = 31.4 LF/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Piping - 4"/8" & 6"/10"	15.7	CF	$12.45	$195	$195	31.4 LF @ 0.50 LF/drum = 15.7 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Pipe Cleaning - 8" diameter	4205.0	LF	$2.14	$8,999	$8,999	4,205 LF @ 1.0 events/yr = 4,205 LF	DEC 2004 rate * deflator (2004-2010)
Subt - Leachate Coll Syst Mgmt				**$43,806**	**$41,800**	*annual O&M costs plus capital replacement of treatment system, pumps, and piping*	
PCC-9.06.11 AWTS Operation						Shift operation of the AWTS for 12 months	no DEC estimate for this activity: DEC Estimate included in unit rat
Subt - AWTS Operation				**$0**	**$0**	AWTS Operation - operation of AWTS for twelve (12) months during post closure or perpetual care of the site	
						The Cost for operation of AWTS is already provided in the post closure estimate for 7 other units that generate leachate	
PCC-9.06.12 Site Waters Treatment							
Subt - Site Waters Treatment				**$0**	**$0**	*The Cost for treatment of of site waters is already provided in the post closure estimate for 7 other units*	Labor included in PCC-1.7a
PCC-9.06.13 Batch Tank Qualification						2 Batch Qualification tanks prior to discharge to facultative ponds	To Meet LDR requirements
Subt - Batch Tank Qualification				**$0**	**$0**	*The Cost for tank qualifications is already provided in the post closure estimate for 7 other units*	Samples collected by lab technician
PCC-9.06.14 Pond Sampling & Analysis (Outfall 001)						production rate = 2.0 hours per composite sample for a three-person crew	SPDES PreQual Sampling of Outfall 001 prior to discharge
Batch Sampling Events						*1 events @ 3 samp/evnt= 3 samples*	sampling & analysis prior to pond discharge
Subt - Pond Sampling & Analysis				**$0**	**$0**	*The Cost for pond qualifications is already provided in the post closure estimate for 7 other units*	
PCC-9.06.15 Pond S&A Certification & Report						one event per year for divers to check discharge pipe; one predischarge qualification report	
Subt - S&A Cert'n & Report				**$0**	**$0**	*diver(s) to check discharge pipe; also engineer's predischarge qualification report*	Fac Pond 8 out of service empty

PCC-9.06: RMU-2 (6-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.06.16 Empty (Pump) FAC Pond to Outfall 001						prod'n rate = 960,000 gals/day = 60,000 gals/hr = 1,000 gals/min per facility est @ 16 hrs/day O&M	Treated wastewater from all 7 units
FAC Pond 1/2 Inventory in Gallons		*gals*	*n/a*			45.8 *total hours req'd to pump*	& site waters
Subtotal - Pump FAC Pond 1/2				$0	$0	*transfer contents of FAC Pond to discharge pipe to Niagara River (3,000 ft). The Cost for discharge to outfall is already provided in the post closure estimate for 7 other units*	
(Subt: Assemb PCC-9.06.10 thru 9.06.16)				**$43,806**	**$41,800**	RMU-2 *share of annual O&M and capital costs for leachate collection & treatment: provided in post closure cost estimate for 7 other units at facility*	
PCC-9.06.17 N/A							
Subt - N/A				$0	$0		
PCC-9.06.18 N/A							
Subt - N/A				$0	$0		
PCC-9.06.19 N/A							
Subt - N/A				$0	$0		
(Subt: Assemb PCC-9.06.17 thru 9.06.19)				$0	$0	RMU-2 share of annual leachate transport costs - n/a, as leachate pumped directly to the AWTS	
PCC-9.06.20 Tank Assessments						sixteen (16) tanks requiring internal & external inspections once every five years by 1 PE + 2 Techs	
Internal & External Inspections						*16 tanks @ 5 yr inspect = 3.2 tnks/yr @ 7 areas = 0.5 tnks/yr*	
Subt - Tank Assessments				$0	$0	*inspection of 16 tanks*	
						The Cost for tank assessment is already provided in the post closure estimate for 7 other units	
PCC-9.06.21 Tank Assessments						thirty (32) tanks requiring only external inspections once every five years by 1 PE	
External Only Inspections						*30 tanks @ 5 yr inspect = 6.0 tnks/yr @ 7 areas = 0.9 tnks/yr*	
Subt - Tank Assessments				$0	$0	*inspection of 32 tanks*	
						The Cost for tank assessment is already provided in the post closure estimate for 7 other units	
(Subt: Assemb PCC-9.06.20 thru 9.06.21)				$0	$0	RMU-2 *share of annual tank assessment costs: post-closure & perpetual care frequency are equal*	
PCC-9.06.22 Replace Mon Well Pump							
Replace Mon Well Pumps	0.725	pump	$900.00	$653	$653	29 pumps @ 2.5% per year = 0.725 pumps/yr	Site experience third party costs
Technician	2.0	Hour	$38.00	$76	$76	2 hours per year	third party labor costs
Disposal of Pumps	0.725	CF	$12.45	$9	$9	0.725 pumps @ 1.0 CF/pump = 0.725 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Repair Mon Well Concrete Pads	0.725	pad	$131.50	$95	$95	29 pads @ 2.5% per year = 0.725 pads/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Well Surface Concrete	1.45	CF	$12.45	$18	$18	0.725 pads @ 2.0 CF/pad = 1.45 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Repair Mon Well Covers	0.725	each	$371.63	$269	$269	29 covers @ 2.5% per year = 0.725 covers/yr	DEC 2004 rate * deflator (2004-2010)
Disposal of Mon Well Covers	0.3625	CF	$12.45	$5	$5	0.725 covers @ 0.5 CF/cover = 0.3625 CF	DEC 2004 closure rate for large debris * deflator (2004-2010)
Subt - Replace Mon Well Pumps				**$1,125**	**$1,125**	*monitoring well pump maintenance and replacement*	
(Subt: Assemb PCC-9.06.22)				**$1,125**	**$1,125**	*RMU-2 mon well pump maintenance & replacement: post-closure & perpetual care frequency are equal*	

PCC-9.06: RMU-2 (6-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.06.23 Drainage Ditch Repair						ditches estimated to be 10 feet in width	
RMU-2 Drainage Ditches						Perimeter Ditch + Drainage Tile System = 6,500 + 16,400 = 22,900 LF	drainage ditches specific to RMU-2 unit
Facility-wide Drainage Ditches						*22600 LF div by 8 units = 2825 LF* 0 LF for RMU-2	*drainage ditches in non-specific areas of facility*
RMU-2 Downchutes						*1370 LF 26" pipe 800 LF 6" pipe*	
Drainage Ditch Repair	0.053	acre	$5,698.00	$302	$302	22,900 LF x 10 ft/LF = 5.3 acres @ 1.0% per year = 0.053 acres	unit price based upon $5,698/acre (RMU-1 Assembly 14.20)
Downchute Pipe Cleaning 26"	68.5	LF	$2.14	$147	$147	1,370 LF x 5.0% per year = 68.5 LF	DEC 2004 rate * deflator (2004-2010) for cleaning 8" dia pipe
Downchute Pipe Cleaning 6"	40	LF	$2.14	$86	$86	800 LF x 5.0% per year = 40 LF	DEC 2004 rate * deflator (2004-2010) for cleaning 8" dia pipe
Subt - Drainage Ditch Repair				**$534**	**$534**	*stormwater drainage ditch repair*	
						The cost of repair of facility-wide ditches is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.06.24 Drainage Ditch Cleaning						ditches estimated to be 10 feet wide; sediment estimated to be 4 inches deep.	
RMU-2 Drainage Ditches						15500 LF	drainage ditches specific to RMU-2 unit
Facility-wide Drainage Ditches						*22600 LF div by 8 units = 2825 LF* 0 LF for RMU-2	*drainage ditches in non-specific areas of facility*
Drainage Ditch Sediment Cleaning	28.3	CY	$2.38	$67	$67	22,900 LF x 10.0 ft/LF x 0.333 feet (4") = 2827 CY @ 1%/yr = 28.3 CY	unit price based upon FAC Ponds 1/2 excavation (6.11)
Transportation of Ditch Sediment	9.6	miles	$3.25	$31	$31	38.2 tons @ 20 tons/load = 1.9 loads @ 5 miles per load = 9.6 miles	unit price based upon FAC Ponds 1/2 transportation (6.13)
Disposal of Ditch Sediment	38.2	ton	$35.00	$1,337	$1,337	28.3 CY @ 1.35 ton/CY = 38.2 tons	unit price based upon FAC Ponds 1/2 disposal (6.14)
Subt - Drainage Ditch Cleaning				**$1,436**	**$1,436**	*stormwater drainage ditch cleaning*	
						The cost of cleaning of facility-wide ditches is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.06.25 Basin Cleaning						sediment estimated to be 4 inches deep.	
Basin No. 1						*140625 SF div by 8 units = 17578 SF*	
Basin No. 2						*150000 SF div by 8 units = 18750 SF*	
Subt--Basin Cleaning				**$0**	**$0**	*facility stormwater basin cleaning*	
						The cost of cleaning of facility basins is provided in post-closure estimate for 8 other units at the facility.	
PCC-9.06.26 Culvert Maint/Replace						avg culvert = 25' (SLF 11) & 40' (sitewide); various diameters	
RMU-2 *Culverts*						*6 culverts x 40 feet long = 240 LF*	culverts specific to RMU-2 unit
Facility-wide Culverts						*20 culverts x 40 feet long = 800 LF div by 8 units =* 0 LF for RMU-2	*culverts in non-specific areas of facility*
Culvert Cleaning - 18" diameter avg	240	LF	$2.14	$513	$513	240 LF	DEC 2004 rate * deflator (2004-2010)
Repl Culvert - 18" diam avg (RMU-2)	80	LF	$11.61	$929	$929	240.0 LF @ 2 culvert/yr = 80 LF	DEC 2004 rate * deflator (2004-2010)
Repl Culv't - 18" diam avg (sitewide)		LF	$22.35	$0	$0	40.0 LF @ 1.00 culvert/yr = 40 LF 0 LF for RMU-2	DEC 2004 rate * deflator (2004-2010)
Replace Culvert - Ditch Excavation	60	CY	$2.96	$178	$178	80.0 LF x 0.75 CY/LF = 60 CY	DEC 2004 rate * deflator (2004-2010)
Replace Culvert - Bkfill/Compaction	60	CY	$3.86	$232	$232	60 CY	DEC 2004 rate * deflator (2004-2010)
Subt - Culvert Maint/Replacement				**$1,851**	**$1,851**	*culvert maintenance and replacement*	
						The cost of cleaning of maintaining facility-wide drainage is provided in post-closure estimate for 8 other units at the facility.	
(Subt: Assemb PCC-9.06.23 thru 9.06.26)				**$3,821**	**$3,821**	RMU-2 *storm drainage maintenance & replacement: post-closure & perpetual care frequency are equal*	

PCC-9.06: RMU-2 (6-Cells)

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.06.27 Road Maint/Replace						gravel roads = 15 feet wide; asphalt roads = 20 feet wide	
RMU-2 *Gravel Roads*						*6500 LF x 15 feet wide/ 9 SF/SY = 10,833 SY @ 2% per year = 216.6 SY*	
Facility-wide Asphalt Roads						*21120 LF x 20 feet wide = 422400 SF @ 1% per year =* 0 SF for RMU-2	*asphalt roads in non-specific areas of facility*
RMU-2 Gravel Road Repair	216.6	SY	$3.12	$676	$676	216.6 SY	DEC 2004 rate * deflator (2004-2010)
Facility-wide Asphalt Roads		SF	$1.35	$0	$0	4,224.0 SF div by 8 units = 528.0 SF 0 SF for RMU-2	DEC 2004 rate * deflator (2004-2010)
Subt - Road Maint/Replacement				**$676**	**$676**	*road maintenance and replacement*	
						The cost of cleaning of maintaining facility-wide roads is provided in post-closure estimate for 8 other units at the facility.	
(Subt: Assemb PCC-9.06.27)				**$676**	**$676**	*RMU-2 road maintenance & replacement*	

Total Non-Super hours 259.6

Basic Closure Activities: Direct Costs	Estimated Quantity	Unit of Measure	Unit Price	2011 CWM Extended Price - Annual Cost Post Closure Period	2011 CWM Extended Price - Annual Cost Perpetual Care	Basis of Production and Quantities for In-house Estimate	In-house Pricing References
PCC-9.06.28 PPE Use/H&S Planning						Level C @ 10%; Mod Level C @ 15%; Level D @ 75% for tot non-supv hrs for all tasks; HASP @ 2.5% of non-supv hrs	
PPE Usage - Level D	24.4	days	$0.00	$0	$0	259.6 hours @ 8 hr/day = 32.5 days @ 75% "D" days = 24.4 days	75% of non-supv hrs in Level D (used facility price: $0/day)
PPE Usage - Mod Level C	4.9	days	$9.00	$44	$44	259.6 hours @ 8 hr/day = 32.5 days @ 15% "C" days = 4.9 days	15% of non-supv hrs in Mod Level C (used facility price: $9/day)
PPE Usage - Level C	3.2	days	$25.00	$80	$80	259.6 hours @ 8 hr/day = 32.5 days @ 10% "C" days = 3.2 days	10% of non-supv hrs in Level C (used facility price: $25/day)
Health & Safety Officer	6.5	hours	$75.00	$488	$488	259.6 hours @ 2.5% hr/hr = 6.5 hours	loaded labor rate: loaded labor rate 2011 3rd party quote
Subt - PPE Usage/H&S Planning				**$612**	**$612**		
PCC-9.06.29 Supervision							
Foreman	0	hours	$65.00	$0	$0	Included in Post-Closure cost estimates for other 7-units at the facility that generate leachate	loaded labor rate: loaded labor rate 2011 3rd party quote
Site Project Manager	0	hours	$75.00	$0	$0	Included in Gen'l Contractor G&A/Home Office indirect costs	loaded labor rate: loaded labor rate 2011 3rd party quote
Subtotal - Supervision				**$0**	**$0**		
(Subt: Assemb PCC-9.06.28 thru 9.06.29)				**$612**	**$612**	supervision, health & safety, and certification	

PCC 9.06 (6-Cells): RMU-2 Direct Cost				**$96,523**	**$82,798**

PCC-9.06: RMU-2 (6-Cells)

Total Cost Summary

Cost Category	**Proposed Percent of Direct Cost**	**Proposed Annual Cost Post - Closure Period**	**Proposed Cost - Annual Perpetual Care**	**Cost Range**
Direct Costs		$96,523	$82,798	
Plus Indirect Costs/Profit:				
Site Activity Management Costs	3.00%	$2,896	$2,483.95	Included in Gen'l Contractor G&A/Home Office (note: DEC uses 3%)
Gen'l Contractor G&A/Home Office	4.00%	$3,861	$3,312	5% for post-closure. (note: DEC uses 4%)
Pre-Construction Design Costs	1.00%	$965	$827.98	For post-closure, design costs minimal and included in Assb 6.21. (note: DEC uses 1%)
Engineering During Construction	1.00%	$965	$827.98	For post-closure, design costs minimal and included in Assb 6.21. (note: DEC uses 1%)
General Contractor Profit	6.00%	$5,791	$4,968	Contractor Profit included in unit rates & Gen' Cont G&A/Home Office (Note DEC adds 6%)
Indirect Costs & Profit	15.00%	$14,478	$12,420	
Subtotal - Direct/Indirect Costs		$111,002	$95,218	
Plus Contingency	15.00%	$16,650	$14,283	DEC uses 15% applied to total cost
Total - PCC-9.06: RMU-2 (6-Cells)		$127,652	$109,501	

RMU-2 Years of Post Closure | Years Since Closure N/A | Post Closure Years Remaining 30

Post Closure Costs Remaining Years		**$3,829,553**
Post Closure Costs 30-Years		**$3,829,553**

Liner Feet of MSE Wall		Cell #	Acres	Cummulative Acres
1-Cell Scenario (Cell 20)	1665	20	6.9	6.9
2-Cell Scenario (Cells 18,20)	2095	18	6.2	13.1
3-Cell Scenario (Cells 18,20,19)	3815	19	6.4	19.5
4-Cell Scenario (Cells 18,20,19,17)	4200	17	5.9	25.4
5-Cell Scenario (Cells 18,20,19,17,16)	5230	16	6.5	31.9
6-Cell Scenario (Cells 18,20,19,17,16,15)	6600	15	6.6	38.5
		Total Area	38.5	acres

Includes slope correction

LEACHATE GENERATION RATES
MODIFIED LINEAR REGRESSION OF RMU-2

Years After Closure	Leachate Removed (Actual)	RMU-2 Leachate Removed (Predicted)	SLF-12 leachate removed per acre
1	n/a	1,012,982	26311.2
2	n/a	635,670	16510.9
3	n/a	339,628	8821.5
4	n/a	199,526	5182.5
5	n/a	249,912	6491.2
6	n/a	135,228	3512.4
7	n/a	107,312	2787.3
8	n/a	118,031	3065.7
9	n/a	116,218	3018.6
10	n/a	151,652	3939.0
11	n/a	121,503	3155.9
12	n/a	109,604	2846.9
13	n/a	76,678	1991.6
14	n/a	79,307	2059.9
15	n/a	66,089	1716.6
16	n/a	82,019	2130.4
17	n/a	90,830	2359.2
18	n/a	65,498	n/a
19	n/a	62,319	n/a
20	n/a	59,447	n/a
21	n/a	56,837	n/a
22	n/a	54,456	n/a
23	n/a	52,274	n/a
24	n/a	50,267	n/a
25	n/a	48,414	n/a
26	n/a	46,698	n/a
27	n/a	45,105	n/a
28	n/a	43,620	n/a
29	n/a	42,235	n/a
30	n/a	40,938	n/a
31	n/a	39,721	n/a
32	n/a	38,578	n/a
33	n/a	37,501	n/a
34	n/a	36,485	n/a
35	n/a	35,525	n/a
36	n/a	34,616	n/a
37	n/a	33,754	n/a
38	n/a	32,936	n/a
39	n/a	32,159	n/a

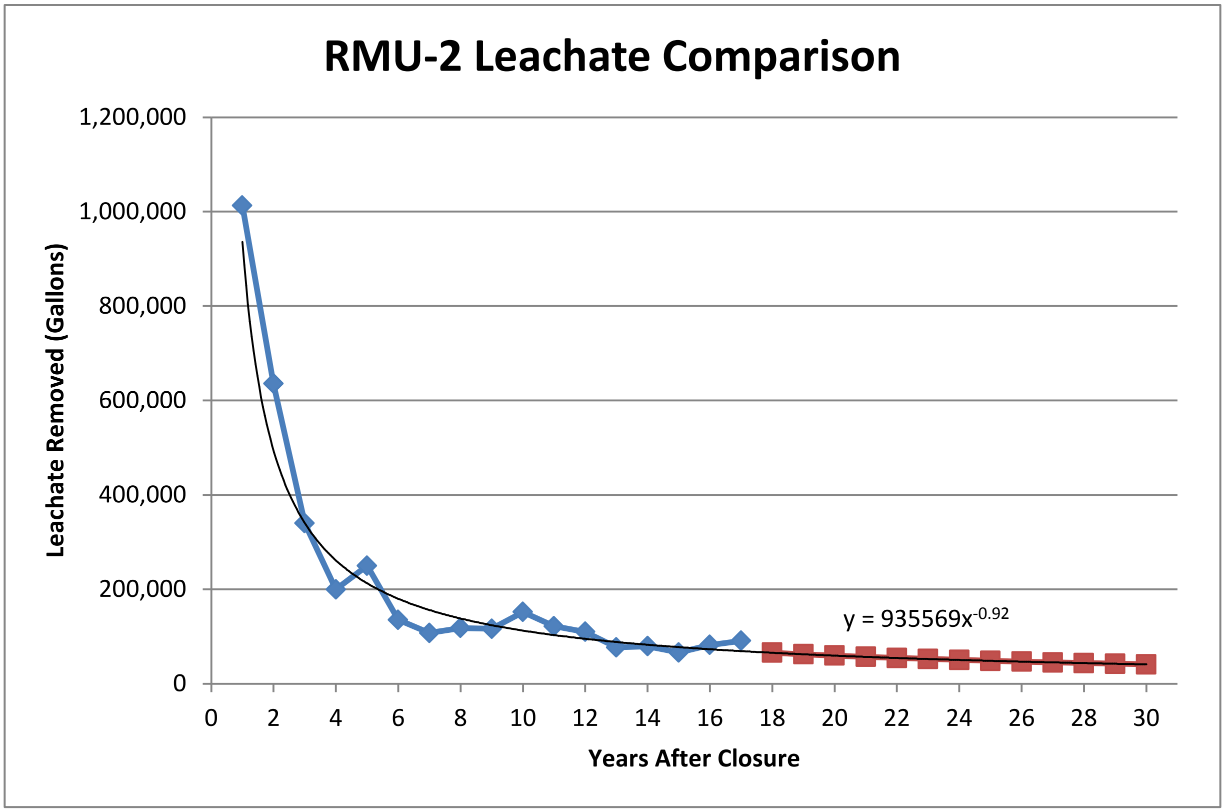
LEACHATE GENERATION RATES
MODIFIED LINEAR REGRESSION OF RMU-2

Years After Closure	Leachate Removed (Actual)	RMU-2 Leachate Removed (Predicted)	SLF-12 leachate removed per acre
40	n/a	31,418	n/a
41	n/a	30,712	n/a
42	n/a	30,039	n/a
43	n/a	29,396	n/a
44	n/a	28,781	n/a
45	n/a	28,192	n/a
46	n/a	27,627	n/a
47	n/a	27,086	n/a
48	n/a	26,566	n/a
49	n/a	26,067	n/a
50	n/a	25,587	n/a
51	n/a	25,125	n/a
52	n/a	24,680	n/a
53	n/a	24,252	n/a
54	n/a	23,838	n/a
55	n/a	23,439	n/a
56	n/a	23,054	n/a
57	n/a	22,681	n/a
58	n/a	22,321	n/a
59	n/a	21,973	n/a
60	n/a	21,636	n/a

Note:

Model based on the per acre generation rate of SLF-12 for each year since closure. The generation rate per acre for SLF-12 was applied to RMU-2 since both landfills are of similar construction. For years after the 17 years since closure of SLF-12, Golder calculated the predicted leachate removed using a power trendline based on actual data from years 0-17.

LEACHATE GENERATION RATES
MODIFIED LINEAR REGRESSION OF RMU-2



145,343	Average of years 0 through 30 years
3,775	Average per acre 0 through 30 years
28,858	Average perpetual care years 31-60
750	Average per acre perpetual care years 31-60

Scenario	0 thru 30	31 thru 60	Cost Estimate
1-Cell	26049	5172	PCC 9.01.10
2-Cells	49454	9819	PCC 9.02.10
3-Cells	73615	14617	PCC 9.03.10
4-Cells	95889	19039	PCC 9.04.10
5-Cells	120427	23911	PCC 9.05.10
6-Cells	145343	28858	PCC 9.06.10

Waste Cover Area Parameters

1-Cell Scenario (Cell 20)	6.9
2-Cell Scenario (Cells 18,20)	13.1
3-Cell Scenario (Cells 18,20,19)	19.5
4-Cell Scenario (Cells 18,20,19,17)	25.4
5-Cell Scenario (Cells 18,20,19,17,16)	31.9
6-Cell Scenario (Cells 18,20,19,17,16,15)	38.5

“PROCESS & INSTRUMENTATION DIAGRAMS (PIDS) FOR TANK SYSTEMS” REVISIONS/ADDITIONS

&

“AQUEOUS WASTE TREATMENT SYSTEM OPERATIONS AND MAINTENANCE (O&M) MANUAL” REVISIONS/ADDITIONS

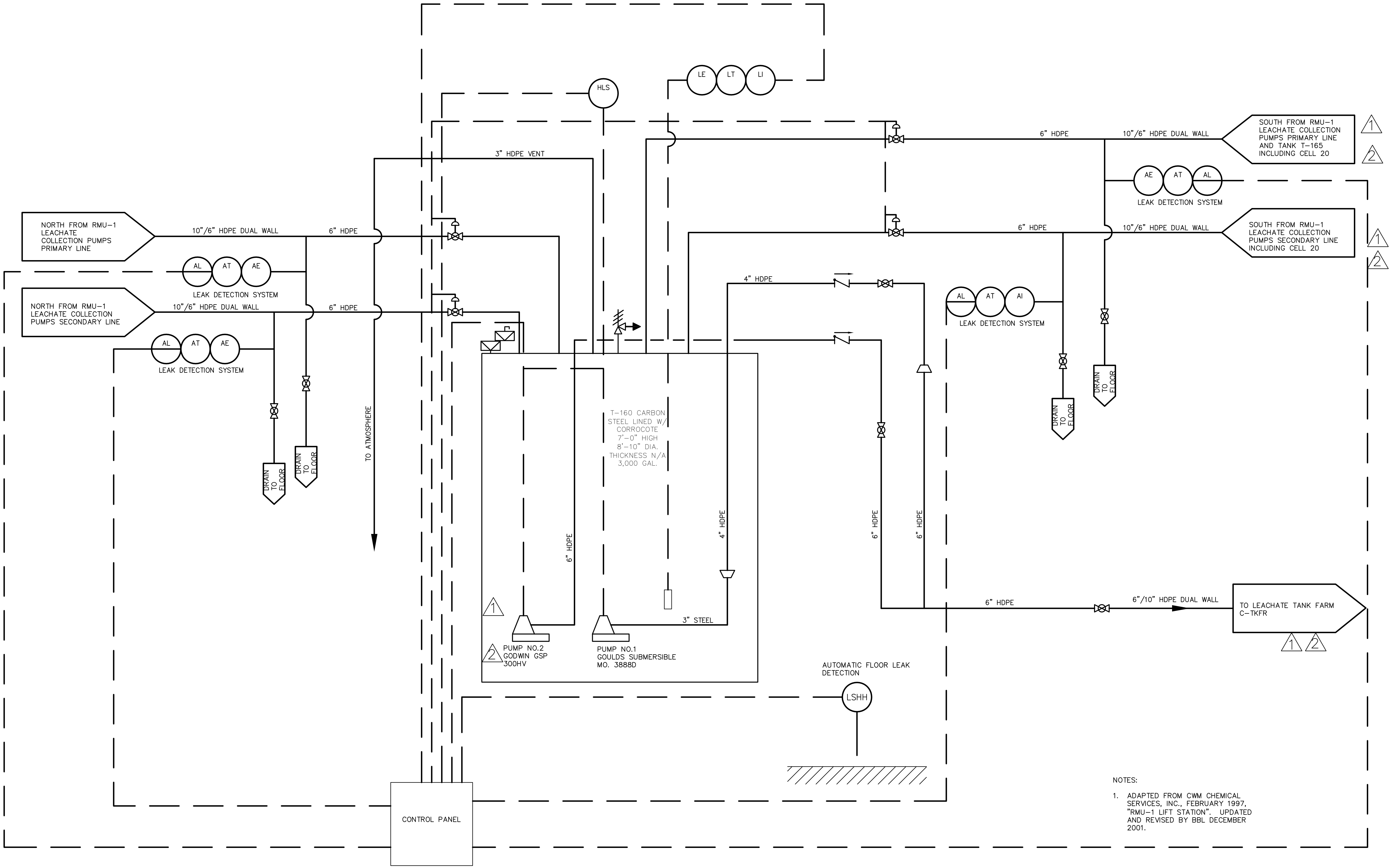
ATTACHEMENT 1
Proposed Revisions to Process & Instrumentation Diagrams and
AWTS O&M Manual for
RMU-2 Development

Revisions to Process & Instrumentation Diagrams (Sitewide Permit Reference Document)

- Sheet 3 – RMU-1 Lift Station with RMU-2 Cell 20 (dated 5/23/13). Replaces Sheet 3 (dated 3/20/12) in currently approved P&ID package upon construction of Cell 20 of RMU-2. Sheet 3 shall be deleted from the P&ID package upon construction of Cell 17 of RMU-2, closure and demolition of tank T-160 and RMU-1 Lift Station Building, and installation of new leachate transfer forcemains from RMU-1 and RMU-2.
- Sheet 9A – SLF-12/RMU-1 Oil Water Separator (RMU-2 Final Buildout, dated 5/23/13). Sheet 9A will replace Sheet 9 (dated 4/24/12) in currently approved P&ID package upon construction of future cells of RMU-2.

AWTS Process Flow Diagram

- Figure 1.1(a) – AWTS Flow Chart. Replaces Figure 1.1 of the currently approved AWTS O&M Manual, dated September 2013 upon construction of Cell 20.
- Figure 1.1(b) – AWTS Flow Chart. Replaces Figure 1.1(a) of the AWTS O&M Manual upon construction of Cell 17 of RMU-2, closure and demolition of tank T-160 and RMU-1 Lift Station Building, and installation of new leachate transfer forcemains from RMU-1 and RMU-2.



NOTES:

1. ADAPTED FROM CWM CHEMICAL SERVICES, INC., FEBRUARY 1997, "RMU-1 LIFT STATION". UPDATED AND REVISED BY BBL DECEMBER 2001.

REVISION	NO.	BY	DATE
ADDED RMU-2 CELL 20 AND GENERAL SYSTEM UPDATES	2	JCD	5/23/13
GENERAL SYSTEM UPDATES	1	JCD	3/20/12

EnSol, Inc.
Environmental Solutions
661 MAIN STREET
NIAGARA FALLS, NY 14301
PHONE (716) 285-3920 FAX (716) 285-3928

PROJECT NO: 12-7008
SCALE: NOT TO SCALE
DWG: D03_12-7008 C-RMU-1 SHT3 REV 2.dwg
DES. BY: JCD | DRW. BY: JCD | CHK. BY: BDS
DATE: MARCH 2012

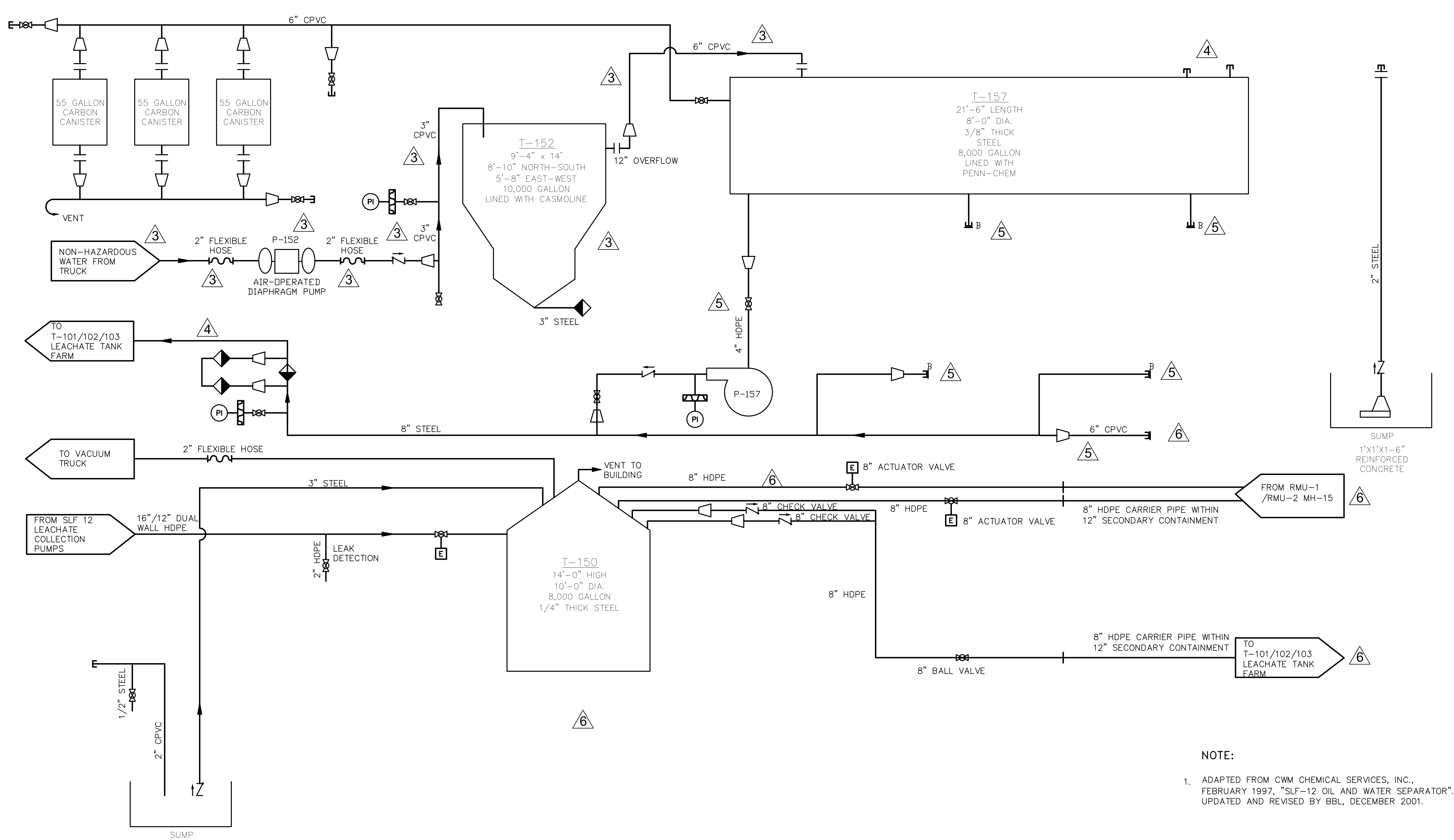
TITLE: RMU-1 LIFT STATION WITH RMU-2 CELL 20
PROCESS AND INSTRUMENTATION DIAGRAM

PROJECT: CWM FACILITY P&ID UPDATES

PREPARED FOR: CWM CHEMICAL SERVICES, LLC. MODEL CITY FACILITY

TOWN OF PORTER | COUNTY OF NIAGARA | STATE OF NEW YORK

DRAWING C-RMU-1 WITH CELL 20 (SHEET 3)



NOTE:

1. ADAPTED FROM CWM CHEMICAL SERVICES, INC., FEBRUARY 1997, "SLF-12 OIL AND WATER SEPARATOR". UPDATED AND REVISED BY BBL, DECEMBER 2001.

REVISION	NO.	BY	DATE
REMOVED 6" Ø CPVC AND 6" Ø STEEL PIPING FROM T-150. ADDED 8"Ø HDPE PIPING WITH VALVES FROM T-150 TO T-101/102/103	6	JCD	5/23/13
REMOVED P-158 AND P-159 AND 8"Ø STEEL PIPING. BLIND FLANGED T-157 OUTLETS.	5	JCD	4/24/12
DISCONNECTED/ CLOSED TANK T-157. REMOVED 8" Ø PIPING, ADDED 6" Ø CPVC BY PASS.	4	CAC	9/14/11
ADDED TANK T-152 AND ASSOCIATED PIPING & COMPONENTS	3	MJM	4/25/08
REMOVED BAG FILTERS; LABELLED PUMPS; REMOVED PRESSURE GAGE AND VALVES; LABELLED "2" STEEL".	2	MJM	11/15/06

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PROJECT NO: 05-7017
SCALE: NOT TO SCALE
DWG: 05-7017-SLF12 OWS SHT9.DWG
DRAWN BY: MJM | CHECKED BY: BDS
DATE: JULY 2006

TITLE: SLF12 OIL WATER SEPARATOR (RMU-2 FINAL BUILDOUT)
PROCESS AND INSTRUMENTATION DIAGRAM

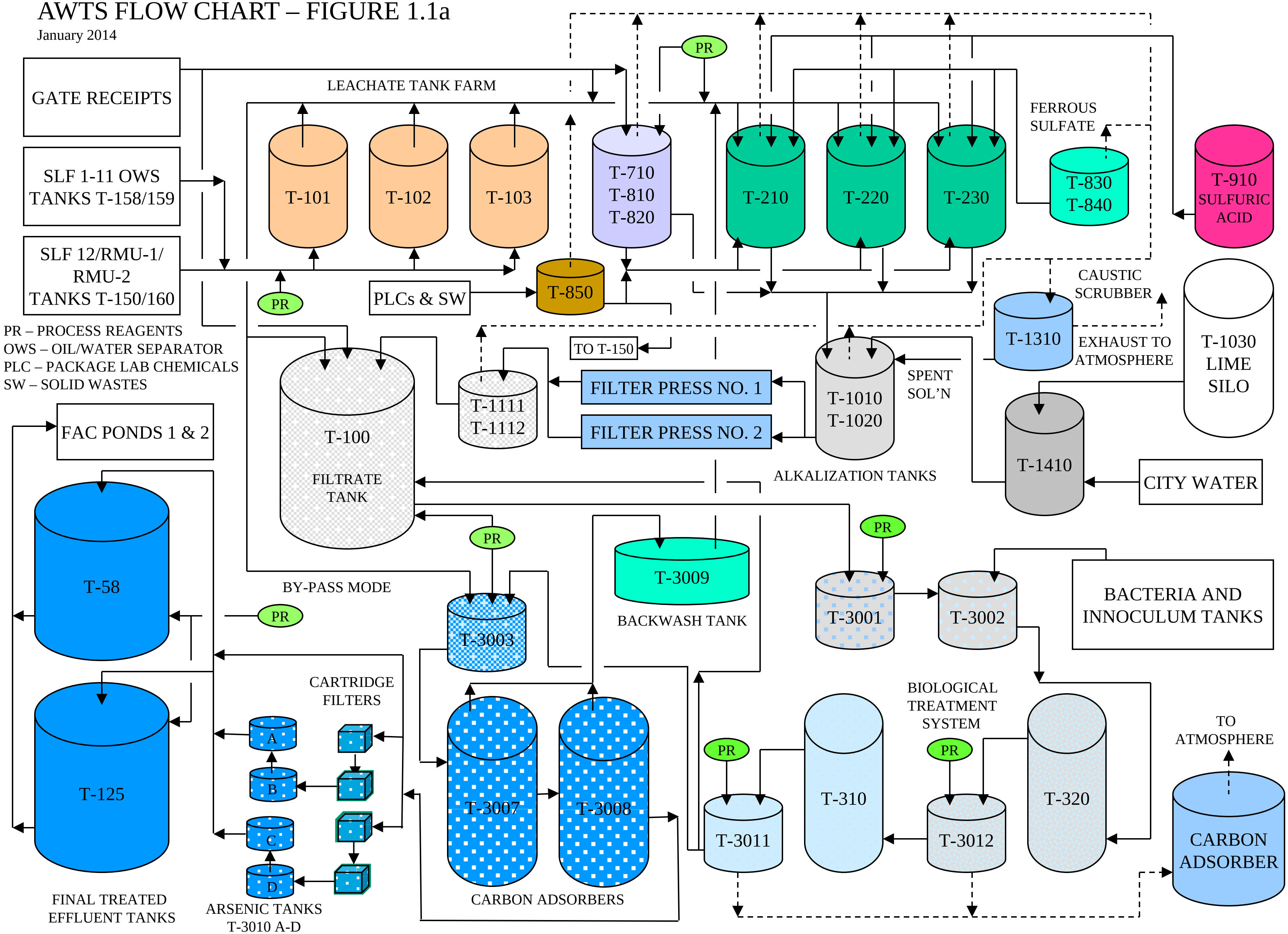
PROJECT: CWM FACILITY P & ID UPDATES
PREPARED FOR: CWM CHEMICAL SERVICES, LLC., MODEL CITY FACILITY
TOWN OF PORTER | COUNTY OF NIAGARA | STATE OF NEW YORK

DRAWING
C-SLF12
(SHEET 9A)

X:\AAAp\CWM\13-7017 RMU-2 Permit P & ID Drawing Updates (Task 3)\ACAD\D09_08-7020-SLF12 OWS SHT9 REV6.dwg, 5/24/2013 1:36:49 PM

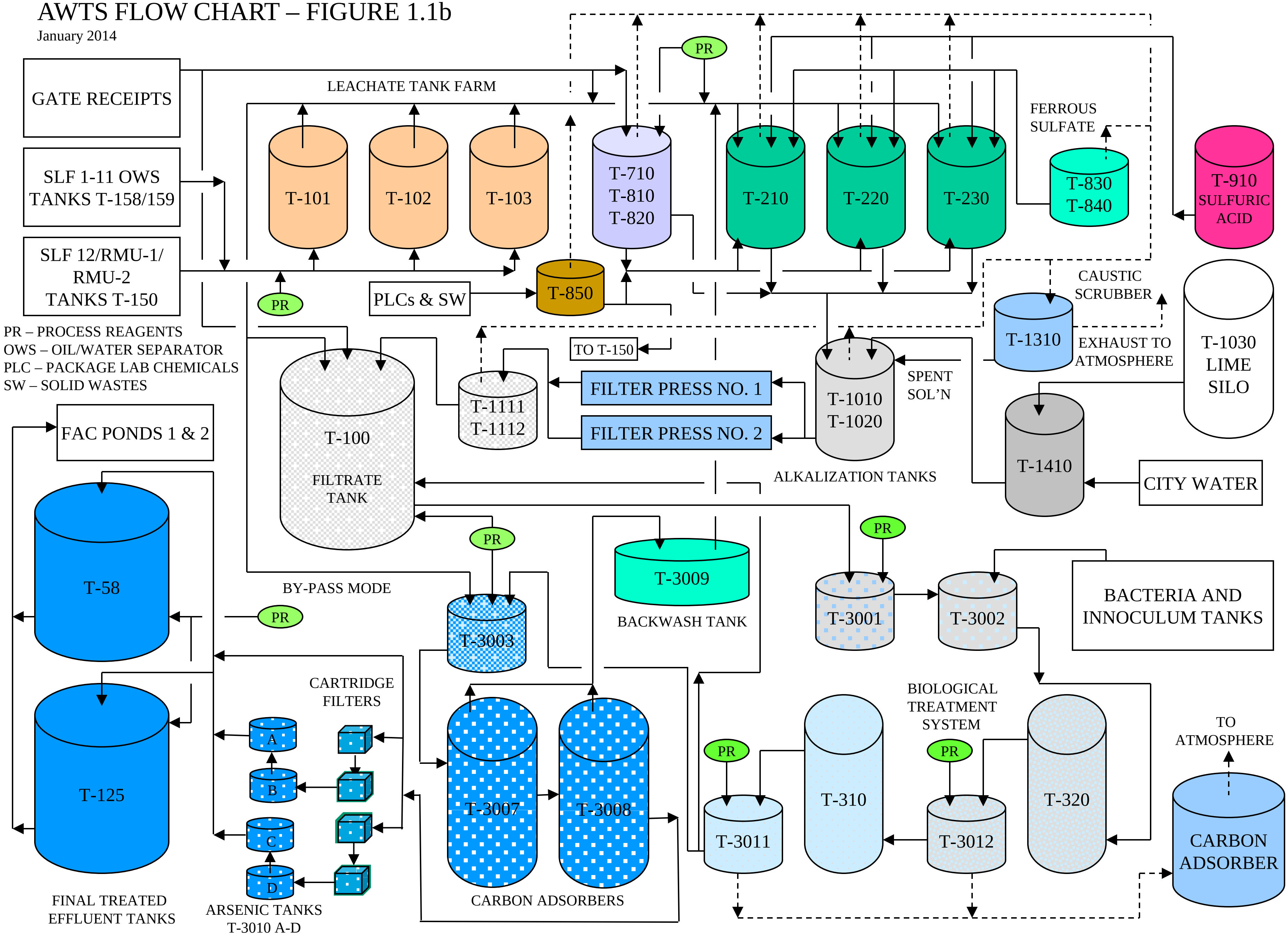
AWTS FLOW CHART – FIGURE 1.1a

January 2014



AWTS FLOW CHART – FIGURE 1.1b

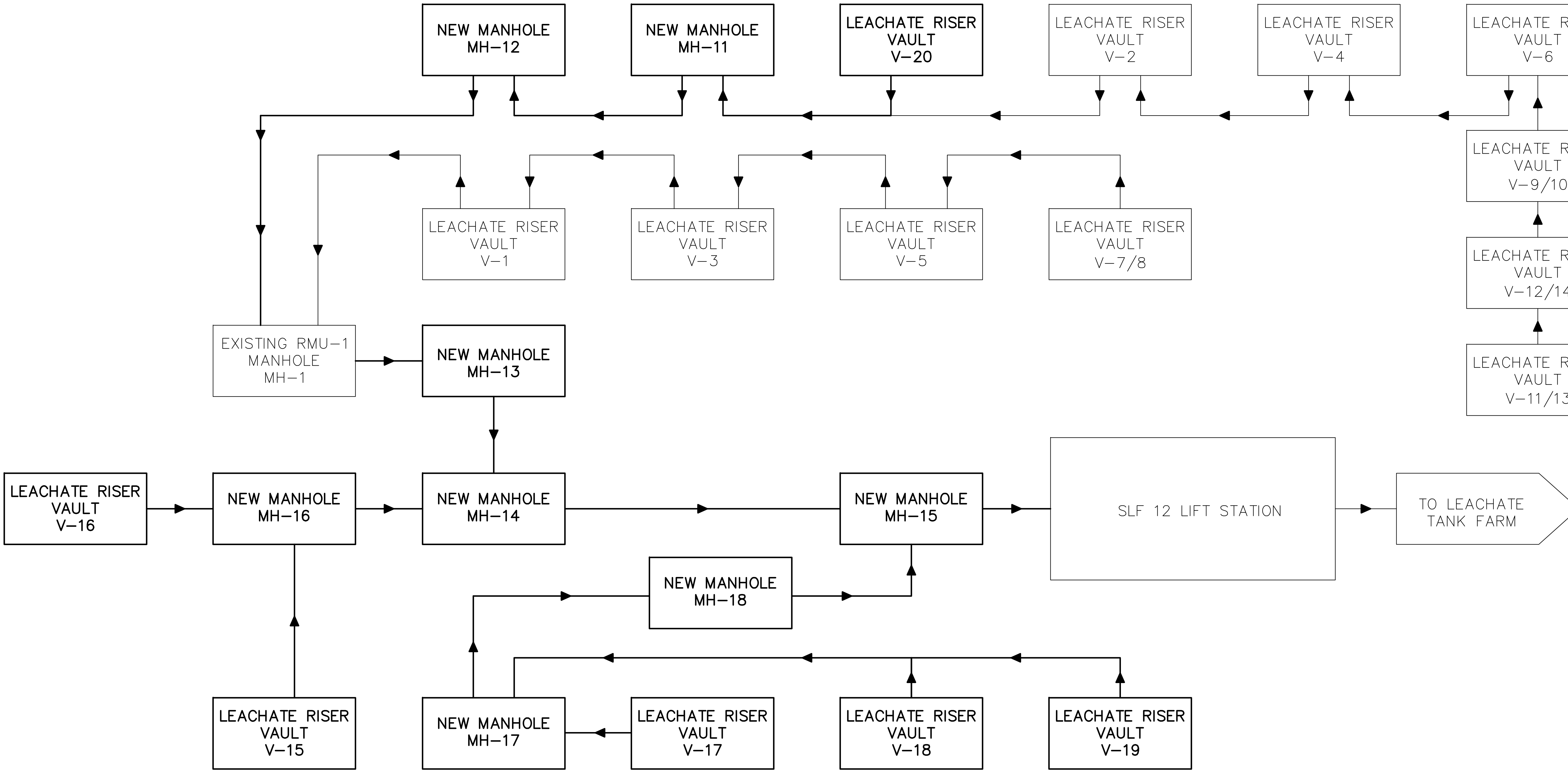
January 2014



ATTACHMENT 2
Process Flow Diagram and
Process & Instrumentation Diagrams for
RMU-2 Development

RMU-1/RMU-2 Process Flow Diagram and Piping & Instrumentation Diagrams

- Figure 1 – RMU-2 Process Flow Diagram at Final Buildout
- Figure 2 – RMU-1 Piping & Instrumentation Diagram at Final Buildout
- Figure 3 – RMU-2 Piping & Instrumentation Diagram at Final Buildout



NOTES:

1. BOLD INDICATES NEW INFRASTRUCTURE

RMU-2
PROCESS FLOW DIAGRAM
FINAL BUILDOUT

CWM CHEMICAL SERVICES, LLC
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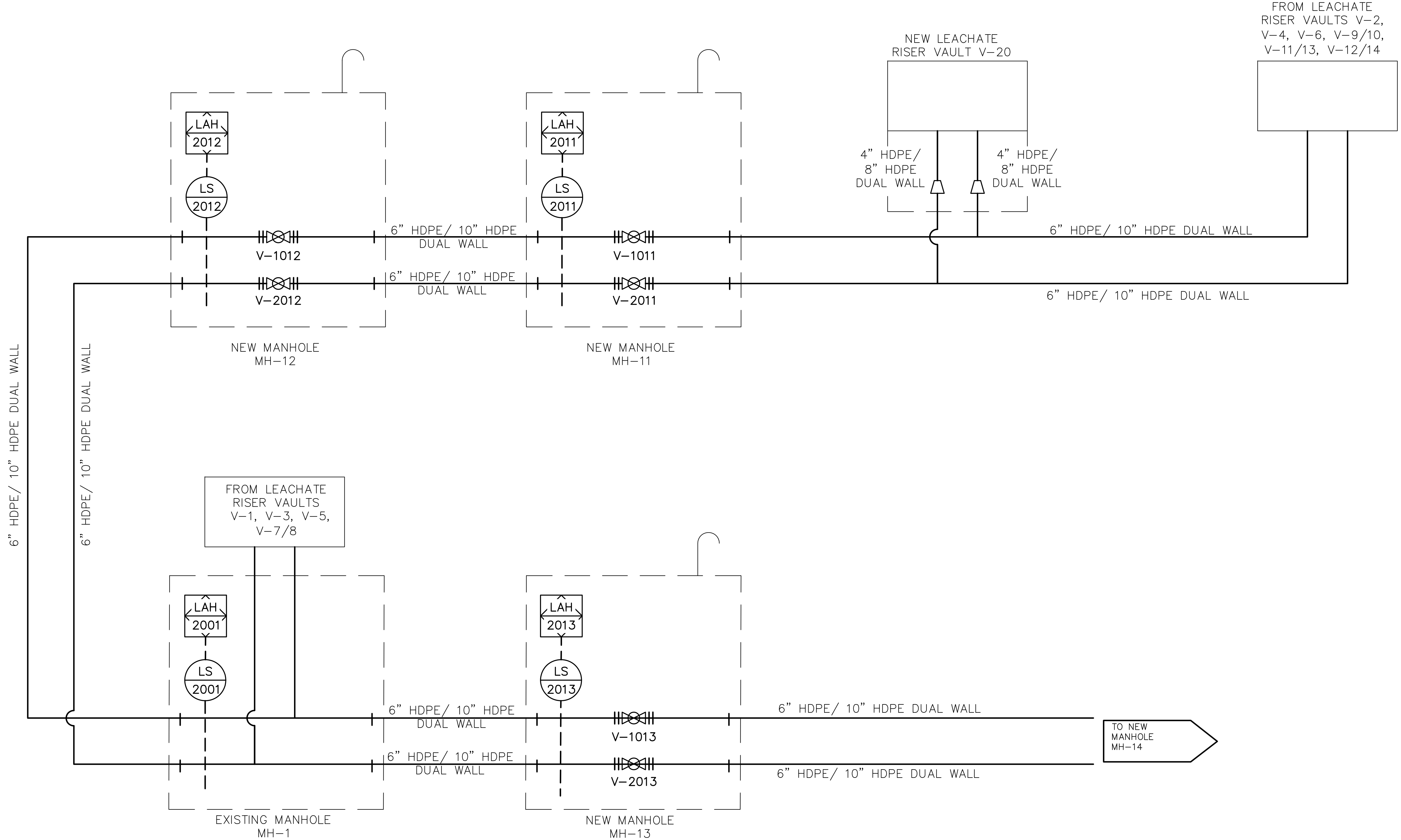
FAX (716) 285-3928

MAY 2013 | PN: 13-7017

FIGURE 1



NOTES:

1. THIS DRAWING REPRESENTS THE P&ID AFTER RMU-1 LIFT STATION CLOSURE

RMU-1 PIPING AND INSTRUMENTATION DIAGRAM

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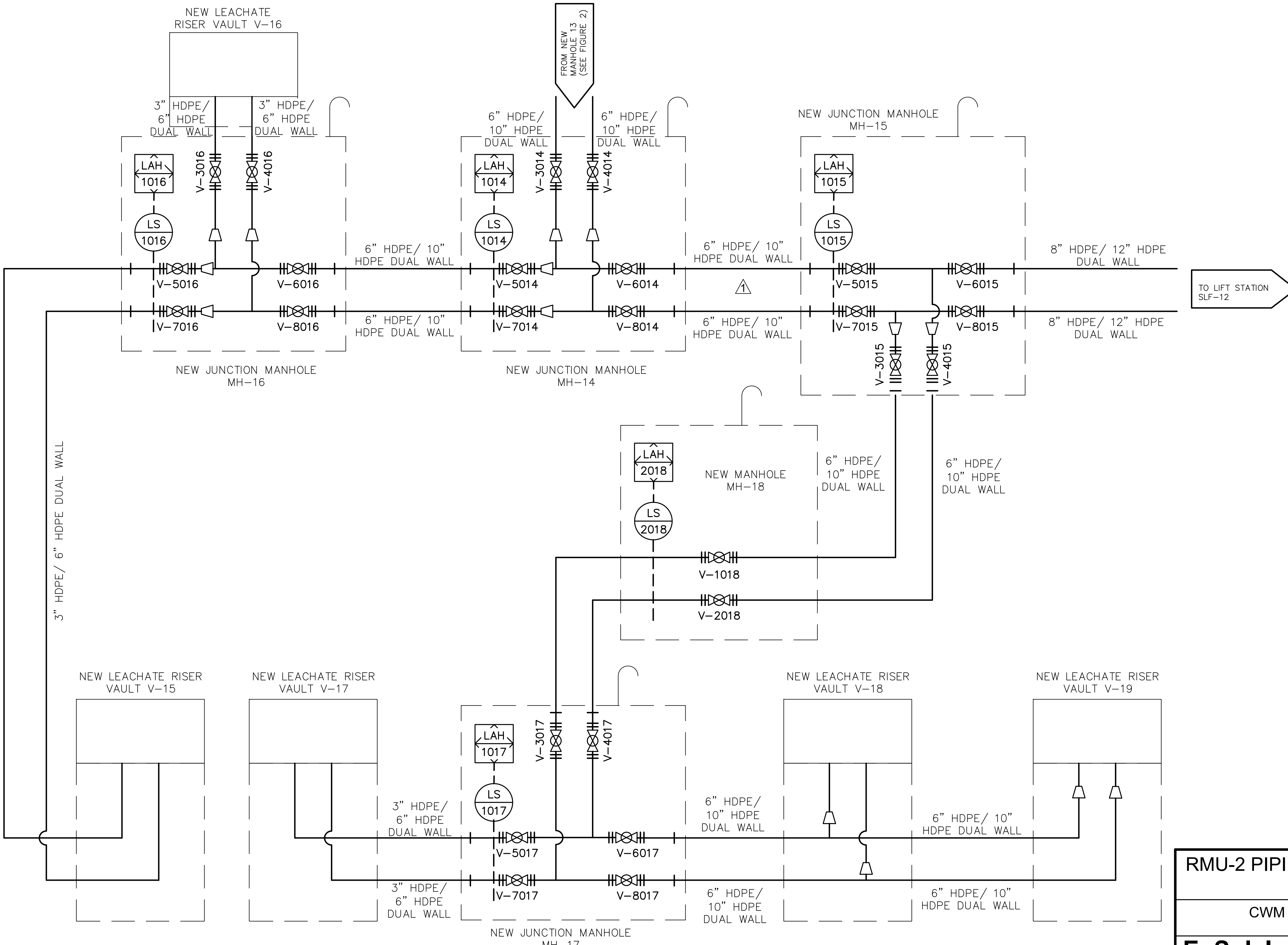
FAX (716) 285-3928

FIGURE 2

MAY 2013 | PN: 13-7017



REVISIONS	BY	DATE
1 CHANGED SECTION OF PIPE FROM 8/12 DUAL WALLED TO 6/10 DUAL WALLED	TAS	10/1/13

RMU-2 PIPING AND INSTRUMENTATION DIAGRAM

CWM CHEMICAL SERVICES, LLC
MODEL CITY, STATE OF NEWYORK

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NIAGARA FALLS, NY 14301
PHONE (716) 285-3920
FAX (716) 285-3928

FIGURE
3

MAY 2013
PN: 13-7017

“GROUNDWATER SAMPLING AND ANALYSIS PLAN (GWSAP)”

GROUNDWATER SAMPLING

AND ANALYSIS PLAN

November 19, 2013

Revised: December 18, 2013

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IN ORDER FOLLOWING REFERENCES

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IN ORDER FOLLOWING TABLES

LIST OF APPENDICES

IN ORDER FOLLOWING FIGURES

1.0 INTRODUCTION

CWM Chemical Services, L.L.C. (CWM) owns and operates a Treatment, Storage, Disposal and Recovery (TSDR) Facility at Model City, New York. Groundwater monitoring at the facility is required to comply with Title 6 of the New York Code of Rules and Regulations Part 373-2 (373-2). In a permit condition in the SLF-12 permit (Appendix A), the New York State Department of Environmental Conservation (NYSDEC) required the preparation of a Groundwater Sampling and Analysis Plan (GWSAP). The site-specific requirements for groundwater monitoring are located in Condition L, of Exhibit F of Schedule 1 of Module I of the Sitewide Permit issued August 21, 2013.

This GWSAP provides procedures for collecting groundwater samples that are:

1) fully comprehensive to cover any sampling circumstance that might occur during the routine monitoring program;

2) technically sound so that the groundwater samples collected are subject to minimal sampling and analytical bias; and

3) uniform so that all the groundwater samples are collected and analyzed in a consistent manner for comparison purposes.

The procedures and protocols outlined in the GWSAP are applicable only to the routine groundwater monitoring program. Other monitoring programs (Surface Water Monitoring, Air Monitoring, etc.) have sampling and analysis plans developed specifically for them.

The GWSAP is kept at the facility and is updated as necessary. All site personnel involved in collecting and/or analyzing groundwater samples are appropriately trained in its application.

The GWSAP has been prepared from a number of documents. The documents include:

- Revised Final Report, Groundwater Monitoring Program for New York State Part 373-2 Permit, Model City TSD Facility," Volumes I and II, (Reference 1).

- WM Manual for Groundwater Sampling, (Reference 2),

- Sitewide Permit, Condition L, Exhibit F of Schedule 1 of Module I,

- Test America Laboratories, Inc., Quality Assurance Manual, February 2013(Reference 20).

The GWSAP primarily addresses the current monitoring requirements of the site's routine groundwater monitoring program. This program is very specific in its requirements for sample collection from certain wells at specified frequencies for specific parameters.

2.0 SITE BACKGROUND

The Model City TSDR Facility is located in Niagara County, New York, near the Niagara River and Lake Ontario (see Figure 1). The U.S. Government used the Facility for a variety of industrial purposes between 1942 and 1959.

The site was sold to a real estate company in 1966. In 1972, Chem-Trol Pollution Services purchased the site and began to use it as a private industrial waste operations facility. Chem-Trol was purchased by SCA Services, Inc. in 1973, then in 1984, SCA Services, Inc. was acquired by a WMI affiliate, Waste Management Acquiring Corporation, making SCA Chemical Services, Inc. a wholly-owned subsidiary of WMI.

In 1987, SCA Chemical Services, Inc. became a wholly owned subsidiary of Chemical Waste Management, Inc. and in July 1988, the facility name was changed to CWM Chemical Services, Inc. In 1998, CWM became a Limited Liability Company (L.L.C.) while its parent company Waste Management merged with USA Waste.

2.1 SITE DESCRIPTION

Current operations at the facility include treatment, recovery, disposal, and transfer of hazardous and industrial waste. The operations are comprised of waste receiving areas, storage and mixing tanks, chemical treatment facilities, biological treatment impoundments, and secure landfills.

The general site layout is shown on Figure 2.

2.2 SITE STRATIGRAPHY

The Model City Facility is situated on the Ontario Plain, an area of low topographic relief between the Niagara Escarpment and Lake Ontario. The unconsolidated geology at the site consists of about 30 feet to 60 feet of glacial and glaciolacustrine deposits of Late Wisconsin age. The glacial deposits overlie an estimated 1,000-foot thick sequence of red shale, siltstone, and sandstone of the Queenston Formation of Upper Ordovician Age.

The stratigraphy at the Model City Facility was described in detail in the Hydrogeologic Characterization Study report, 1985 (Reference 3), and updated in 1988 (Reference 4) and again in 1993 (Reference 8). The upper portion of the stratigraphy at the site generally includes low permeability Silt and Clay Tills over Glaciolacustrine Clay, underlain by a Glaciolacustrine Silt/Sand unit. Beneath these units is a lodgment till (Basal Red Till) above a shale bedrock.

Over the northwestern portion of the site, the Glaciolacustrine Clay unit is separated into upper and lower members by the Middle Silt Till, which was apparently deposited during a local oscillation of the glacial ice advance. The properties of the various glacial deposits are summarized in Table 1. This general stratigraphy is depicted on Figure 3 using two site borings for illustration. The hydraulic conductivities (permeabilities) of the geologic formations are also summarized in Table 1. These data indicate that the Glaciolacustrine Silt/Sand stratum is the most permeable geologic unit and forms the uppermost aquifer underlying the facility. The Silt Till, Clay Till, and Glaciolacustrine Clay above this aquifer are very low permeability materials, which restrict aquifer recharge from infiltration. The Basal Red Till and bedrock beneath the aquifer are also low permeability units, although the shallow, weathered bedrock is more permeable than the deep bedrock.

2.3 HYDROGEOLOGIC CHARACTERISTICS

Groundwater levels were measured in all of the site wells and piezometers most recently in October 2012. Potentiometric contours for the Glaciolacustrine Silt/Sand aquifer and the shallow water table in the Upper Tills, are available in Reference 15.

The groundwater potentiometric contours in the Glaciolacustrine Silt/Sand aquifer indicate that the flow direction is generally to the north, as expected from the regional hydrologic setting and historical site water level data, with a flow component toward the west. The water levels in the Glaciolacustrine Silt/Sand aquifer are several feet lower than those in the Upper Tills, which indicates a general downward (vertical) gradient across the site.

Previously, CWM had identified an artificially induced southerly flow component across the southeastern portion of the Facility. Additional investigations regarding this situation included the quarterly collection of water levels in the GSS to monitor this area, (see Reference 9). Current, GSS Potentiometric maps no longer show this southerly flow component.

Lateral gradients are low in the glacial aquifer and the rock because of the near-horizontal configuration of the top of rock and of the ground surface between the Niagara Escarpment and Lake Ontario. There is some ridging of bedrock across the site, which causes areas of steeper lateral gradients in the aquifer.

The potentiometric contours for the Upper Tills indicate that the shallow water table reflects the surface topography with a typical groundwater flow direction to north-northwest. The water table was about 9.2 feet below the ground surface in October 2012. In the vicinity of the FAC ponds and other unlined units, where some hydraulic connection is anticipated, the contour interpretation indicates elevated potentiometric levels, approaching the water levels in these facilities.

Because of the low hydraulic conductivity of the clay liners used for embankment construction and of the surrounding soils, these elevated potential levels dissipate at or near the embankments of these facilities. Also, drainage ditches at the site locally depress the surrounding water table. Lateral gradients in the Upper Tills (near surface water table) are low with respect to the vertical gradients across the site as a whole, but may steepen locally around the surface drainage features and around the open ponds with water levels above the natural water table, as discussed above. References 3, 4, and 8 clearly demonstrated that the Glaciolacustrine Silt/Sand unit is a confined aquifer and is the uppermost aquifer at the site. Primary aquifer recharge is from vertical flow through the upper glacial soils. The estimated groundwater flow rates through the various geologic units are low, on the order of feet to fractions of a foot per year. A schematic flow system is presented in Figure 4.

3.0 ROUTINE GROUNDWATER MONITORING SYSTEM

The routine groundwater monitoring system at the Facility is unit-specific. Each regulated unit is monitored by wells on the downgradient sides, typically north and west. Upgradient wells along the facility's southern boundary act as background wells for all regulated units.

The monitoring well system consists of uppermost aquifer (deep) wells and saturated zone (shallow), non-aquifer system wells. The uppermost aquifer system is the Detection Monitoring System required by 6 NYCRR 373-2.6. The Detection Monitoring System wells are installed in the Glaciolacustrine Silt/Sand Unit, which is the uppermost aquifer.

The shallow wells are installed in the Upper Tills above the Glaciolacustrine Clay unit. The shallow wells were installed to provide an early detection of potential releases to the groundwater system. Also, former operations, which have resulted in soil and groundwater contamination, might also be indicated from groundwater monitoring data from these wells.

3.1 GROUNDWATER MONITORING NETWORK

The site's active groundwater monitoring network consists of shallow wells, deep wells, piezometers, and Groundwater Extraction Systems (GWES) included in Table 2. The majority of these wells are used for routine monitoring, while the minority are used strictly for investigative purposes and are not subject to statistical analyses (see Table 2). Finally, a few wells are used for both purposes.

The wells and piezometers installed generally consist of 2-inch diameter, type 304 stainless steel (or PVC) well screen and riser pipe with flush-threaded joints. The screen sections of all wells and piezometers consist of No. 6 slot (0.006 inches) spiral-wrapped screen. A summary of the construction details for these wells and piezometers, including the regulated unit monitored by each, is presented in Table 3. The boring logs and well installation logs can be located in Appendix B-1, (RMU-1 boring and well installation logs are in References 9 and 10, RMU-2 boring and well installation logs are in References 25 and 26 while the GWES logs are in References 11, 12 13 14, 19, 21, 23 and 24).

The well and piezometer locations are shown on Figure 5. A schematic diagram of the deep and shallow wells is shown on Figure 6. All wells and piezometers were developed after the well installation was completed. The well and piezometer development procedures are discussed in Reference 5, but generally include evacuating a well or piezometer using compressed air until the pH and specific conductance have stabilized and the water appears clear. Well development data are presented in Appendix B-2 and are summarized in Table 4 or can be found in References 9, 11, 16 17, 23, 25 and 26.

3.2 HYDRAULIC CONDUCTIVITY

Hydraulic conductivities were evaluated for all new wells using rising head tests. These tests were performed upon completion of well development. They consisted of purging by bailer or by gas lift, then monitoring the water level during recovery. The water level data and recovery curves can be found in Appendix B-3 or References 9, 10, 16, 17, 21, 25, and 26.

Rising head tests were analyzed using a water level versus time relationship developed for cased holes with uncased (screened) extensions by Hvorslev (Reference 6). This method is applicable for hydraulic determinations at depth in soils that are relatively homogeneous and isotropic. The method assumes constant pressure levels in the formation, (i.e. that the well does not materially affect the formation potentiometric surface). The formula used in the analysis includes a well shape factor dependent on open interval length, radius of intake point and radius of standpipe, and a recovery term dependent on rate of change of unrecovered head. Hydraulic conductivity values estimated from the new site wells ranged between $6x10^{-4}$ cm/s in the aquifer and $4x10^{-8}$ cm/s in the Upper Tills. Details of the rising head tests and hydraulic conductivity estimates are included in References 5, 9, 10, 16 17, 25, and 26; the results are summarized in Table 4.

3.3 GROUNDWATER MONITORING SYSTEM MAINTENANCE

The groundwater monitoring system is maintained throughout the site's lifetime. Routine visual inspection of the well sampling system, the protective casing, the locking cap, well ID tag, lock, drainage, guard posts, and the concrete pads are conducted during each sampling event (see Table 6).

Every five years (unless noted below), the integrity of the groundwater monitoring system receives a thorough examination. The next "quintennial inspection" will be performed in 2016. The examination is certified by a professional engineer or by a qualified geologist and includes the following:

1. A survey of all groundwater wells and piezometers in the monitoring network performed by a New York State licensed surveyor to establish the top of well casing elevations and to provide an updated site plan. The survey must be accurate to within 0.01 feet of elevation and the site plan must be presented on a scale of 1 inch equals 200 feet;

2. An establishment of the ability of all wells and piezometers in the monitoring network to yield meaningful groundwater level elevations (or potentiometric surface information) when measured with a device accurate to within 0.01 feet. The ability of the wells to yield such information should be based upon a comparison of historic groundwater elevations from the wells and upon physical examination of the wells for screen obstructions. For most wells, the only type of physical examination necessary to demonstrate that the screen has not become obstructed will be "sounding" to establish the elevation of the bottom of the well.

It should be noted that although the well depth measurement is recorded to the nearest 0.01 foot, it is not as accurate as the water level measurement because the bottom is determined entirely by "feel." The procedure for "sounding" a well is as follows:

a. Rinse the water level indicator cable and probe off with DI water, shaking off any excess water.

b. Remove the dedicated sampling equipment from the well. Visually inspect the equipment for defects and protect the equipment from becoming contaminated. (Well Wizards™ are pressure tested according to the Well Wizard™ System Diagnosis Guide. See Appendix C-5).

c. Lower the probe into the well until it hits the bottom of the well; pull up the slack until tension is felt on the cable.

d. Slowly raise and lower the probe until a "feel" for the bottom is obtained.

e. Using the same reference point from which the elevation measurement is taken, read the depth off of the cable to the nearest 0.01-foot.

f. Wind the cable back onto the spool, rinse with DI water, and shake off any excess water.

g. Carefully replace the dedicated sampling equipment back into the well.

h. Record well depth measurement and inspection results in the Field Notebook. Replace sampling equipment as necessary, (i.e. excessive oxidation, frayed bailer cable, etc.).

A well is considered obstructed if 10% or more of the well screen (e.g. one foot for wells with 10-foot screen) is blinded or otherwise inaccessible. At a minimum, these wells are to be redeveloped to remove sediments from the bottom of the well;

3. An establishment of the ability of all groundwater wells to yield representative samples for determining the concentration of hazardous constituents that may be present in the groundwater. The ability of the wells to yield such information should be based upon a comparison of historic chemical analyses from each well and upon physical examination of the wells. Physical examination of the well will include removal and inspection of any dedicated sampling device to assure that the device is functioning as designed; and

4. The first triennial inspection (1991) indicated that most wells and sampling devices were in excellent condition, therefore, the inspection procedures were reduced to once every five years, next due in 2016. For well W1108D due to unusual wear on the equipment, the inspection remains at once every three years; next due in 2014.

If, for any reason, CWM personnel suspect that a well or piezometer is no longer providing representative samples or accurate potentiometric values, or may be damaged in some way, CWM must attempt to remedy the problem within 14 days. If the problem is not resolved, CWM will notify NYSDEC in writing within 30 days after learning that the well is suspect. Included with the notification will be a proposal for rehabilitating the well, if possible, or for replacing the well, if necessary. If CWM is unable to obtain a representative sample from the well as a result of damage to or problems with it or its sampling device, such information will be included in the notification of NYSDEC. Within 30 days after rehabilitation or replacement of the well, the repaired or replaced well will be sampled by CWM. CWM will receive the approval of NYSDEC before removing any well from service.

3.4 MONITORING PARAMETERS AND FREQUENCY

Site-specific indicator parameters (27 VOCs) listed in Exhibit F of Schedule 1 of Module I of the Sitewide Permit, and as presented in Table 5, are used as indicator parameters for this monitoring program. VOCs are present in the leachate and in the waste treatment system, are generally mobile, can be detected in low concentrations, and are not present in natural waters. They also offer the advantage of requiring only a small sample volume for analysis.

Typically, the frequency of sample collection is semiannually for the detection monitoring system. This monitoring frequency will continue through the post-closure monitoring period. Two deep wells were installed at the W202, W1201, W1202, W1203, W1208, F802, R117, and R212 locations because the aquifer was greater than 20 feet in thickness. At each location, the well labeled "UD" is screened in the upper half of the aquifer, while the well labeled "LD" is screened in the lower half of the aquifer. The "UD" wells, namely W202UD, W121UD, W122UD, W123UD, W128UD, F802UD, R117UD, and R212UD are sampled semiannually. The "LD" wells, namely W202LD, W121LD, W122LD, W123LD, W128LD, F802LD, R117LD, and R212LD are sampled once every two years. {NOTE: Currently, R117LD and R117UD are used as deep well piezometers only.}

4.0 PERSONNEL RESPONSIBILITIES

The Environmental Monitoring Group is responsible for the ground water monitoring program at the Facility. This Group is under the direction of the Environmental Monitoring Manager, .

The Group's responsibilities include:

- Communication between the laboratory and regulatory personnel,
- (Re)-train team members,
- Scheduling, supervision, and proper execution of the sampling event, including field equipment procurement, calibration, and maintenance, measurement of field parameters, proper documentation of the sampling event, prompt sample shipment, and inspections, and
- Accurate data evaluation and timely reporting.

4.1 ANALYTICAL LABORATORIES AND RESPONSIBILITIES

Test America Laboratories, Inc. (TAL) in Amherst, New York provides primary analytical services. In addition, Model City Laboratory personnel perform semiannual analyses of the Groundwater Extraction Systems on-site.

Laboratory Contact – Candace Fox (TAL)

> The Laboratory Contact shall provide all sampling containers and associated paperwork (Appendix C-3) in a sealable container (cooler) ready for the Environmental Monitoring Group. The Laboratory Contact shall notify the Environmental Monitoring Group if sample containers do not arrive on schedule or intact after a sampling event. The Laboratory Contact is also responsible for overseeing the laboratory analysis and notifying the Environmental Monitoring Manager if problems arise.

5.0 PRESAMPLING PROCEDURES

Presampling procedures include the procurement and calibration of equipment, procurement and preparation of sample containers, well observations, and well purging. Each of these procedures is addressed in the following sections. Preparation for a sampling event begins at least two weeks before the event is to take place to allow adequate time to accomplish all of the procedures and to correct any problems that may surface.

5.1 LABORATORY NOTIFICATION/VERIFICATION

The Environmental Monitoring Group works closely with the laboratory to schedule sampling events. Prior to each sampling event, the Environmental Monitoring Manager notifies the laboratory of tentative sampling dates, number and types of samples, and numbers and types of blanks. The laboratory prepares the necessary sample containers and sends them to the site in coolers. The Environmental Monitoring Group checks in the coolers and notifies the Environmental Monitoring Manager of any discrepancies.

5.2 PROCUREMENT, INSPECTION, AND CALIBRATION OF EQUIPMENT

NOTE: The collection of "field data" (pH, Specific Conductance, and Temperature) was indefinitely suspended on January 9, 2001. (See S. Doleski to R. Park Zayatz.) Should the collection of this data be re-instated, the following procedures will be used.

The procurement of equipment is the responsibility of the Environmental Monitoring Group.

Field measurements along with proper documentation are integral parts of the monitoring program. Before the actual trip to the field, all equipment necessary for a sampling event is cleaned, checked, and calibrated, as necessary. Prior to use in the field, all meters are calibrated by the Environmental Monitoring Group to ensure proper working order and to render integrity to the measured values. Calibration procedures provided by the manufacturer are to be followed and are attached to this manual as Appendix C-1.

Calibration of the field meter for pH is made using a minimum of two buffers (pH 4, pH 7, or pH 10).The buffers used should bracket the expected pH values of the samples. Since calibration for pH is temperature correlated, calibration is performed using the pH of the buffer at its ambient temperature. A chart of pH at different temperatures is provided on each buffer container. The measured value for the check buffer must be ±0.10 pH unit of the expected value or the meter must be recalibrated, (i.e. pH 4.01 buffer at 20°C must read between 3.91 - 4.11 on the field meter at 20°C).

Calibration of the field meter for specific conductance is made with a standard of approximately the same conductivity as that expected at the site and is measured at 25°C using a NIST-traceable thermometer. At least one additional standard is also checked. This standard has the same conductivity as the original standard, but has been refrigerated. In checking the conductivity of this cooled standard, a verification is also made of the automatic temperature compensator of the meter. The measured value of the cooled standard must be within ±5% of the expected value or the meter must be recalibrated, (i.e. a 1413 μS/cm standard must read between 1342 μS/cm and 1484 μS/cm on the field meter).

The conductivity of the deionized (DI) water being used in the field is also measured. If the conductivity of the DI water is greater than 50 μS/cm at 25 °C, the Environmental Monitoring Manager is contacted and will decide whether to use the DI water or obtain new DI water from an alternative source.

Instrument calibration checks of pH and specific conductance must be made after every 4 hours of operation and at the end of the day. Guidelines for an acceptable calibration check are the same as those for the initial calibration, except only one pH buffer and one conductivity standard is used.

If the calibration check is not within the limits listed above, the meter is completely recalibrated before being placed back into service.

The Environmental Monitoring Group is responsible for maintaining a logbook for all field meters. The log book contains information including field meter serial number, name and model of meter, year purchased, QA results, calibration notes for each day the equipment is used, etc.

5.3 PROCUREMENT AND PREPARATION OF SAMPLE BOTTLES

The procurement and preparation of sample bottles is the responsibility of the laboratory. For routine VOC monitoring, only pre-cleaned, 40-mL, glass vials with Teflon-lined septa are used.

If parameters other than VOCs are required, the laboratory also supplies these additional bottles. As necessary, the laboratory supplies pre-measured amounts of preserving reagents along with the sample bottles. The volume requirements, containers, preservatives used, and holding times for each analyte are presented in Appendix C-2.

TAL sends sample bottles to the site in sealed coolers. Upon arrival, the cooler seal is checked for intactness. The cooler is then "checked in" which involves removing the Chain-of-Custody (COC) and Field Information Form (FIF), (see Appendix C-3), visually examining, inventorying, and labeling the sample bottles, and ensuring the appropriate number and types of preservatives are present. Also, Trip Blank samples are examined for air bubbles.

5.4 STORAGE AND HANDLING OF SAMPLING EQUIPMENT

The sample bottles are stored inside coolers. When unattended, the coolers are stored in a designated, clean area with limited access during the day. This area is kept locked overnight.

All equipment is handled in a responsible manner to prevent breakage or contamination. The handling of any equipment that will come in contact with the sample water is only done wearing new, clean, powderless PVC or Latex gloves.

5.5 PERSONAL PROTECTIVE EQUIPMENT

As part of the site's health and safety program, the wearing of some personal protective equipment is required at all times. Steel-toed boots, long sleeve shirts and pants, and safety glasses are required for all on-site personnel. In addition, gloves are worn for all sampling activities.

Some wells on-site may require additional personal protective equipment. The additional personal protective equipment may include:

- one piece Tyvek or Saranex suits,
- respirators with organic vapor cartridges,
- splash goggles, and
- neoprene boots and gloves.

For site personnel conducting such monitoring refer to the site Health & Safety Manual, HS-1161 for Personal Protective Equipment.

6.0 PURGING PROCEDURES

6.1 FIELD OBSERVATIONS

Upon arrival at the well, various field observations regarding conditions at the well and its surrounding area are made. Specific measurements, such as purge volume determination and groundwater elevation, are also made at this time. These observations and measurements are all documented on the FIF and may include:

- physical surroundings including high weeds, standing water, cleanliness, activities nearby, and access,
- the presence and condition of the well's identification sign,
- well integrity including condition of the dedicated Well Wizard™ or bailer, condition of protective casing, guard posts, and lock, obstructions or kinks in the well casing that would prohibit sampling, presence of water in annular space, evidence of contamination such as animal or insect parts in well, etc.,
- weather conditions, and
- any upwind site activity.

6.2 GROUNDWATER ELEVATION MEASUREMENT

The groundwater elevation at a monitoring well is usually determined during each sampling event. A battery-operated water level indicator is used to measure the "Depth to Groundwater" at each well. To determine the groundwater elevation, the following procedure is used:

1. Rinse the water level indicator cable and probe with DI water, shake any excess water. Switch the instrument on and depress the testing button. A light should be illuminated and/or a buzzing sound should be heard. This ensures that the instrument is working.

2. Slowly lower the probe in the well until the buzzing sound can be heard and/or the red light on the instrument is illuminated.

3. Slowly raise and lower the probe to the exact point where the buzzer and/or light are activated simultaneously. This marks the static water level.

4. Read the depth off of the cable, which coincides with the top of the well casing (or well cap) to the nearest 0. 01-foot and record the measurement on the FIF.

5. Wind the cable back onto the spool, rinse with DI water, and shake off any excess water.

6. Perform a duplicate water level measurement once every 5 wells and record results on the FIF.

7. To convert the static water level measurement to elevation simply subtract the static water level from the well elevation. Measurement of the static water level must be referenced to the well datum.

On an annual basis, the groundwater flow rate and direction is determined in accordance with 6NYCRR 373-2.6(i)(5).

6.3 PURGE VOLUME DETERMINATION

Monitoring wells are evacuated prior to sampling to safeguard against collecting non-representative stagnant water. At a minimum, one to three well casing volumes are to be removed from each well or purging continues until the well goes dry. The volume of water in the well to be purged is calculated using the following equation.

1 Well Casing Volume (gallons) = $7.48(\pi r^2 h)$

Where $\pi = 3.14$
r = radius of well casing (feet)
h = height of water column in well (feet)
7.48 = conversion from ft^3 to gallons.

The height of the water column in the well (h) is calculated by subtracting the "Depth to Groundwater" from the "Well Depth."

The volume of water in a two inch well is calculated as:

1 Casing Volume (gallons) = 0.163h

To measure the volume of water being removed from the well, a graduated 5-gallon bucket or a known-volume container is used to collect the water. The volume of water to be purged is equal to the casing volume at a minimum, however, an effort is made to remove 3 casing volumes, if possible.

6.4 PURGING USING A DEDICATED BAILER

Most shallow wells contain a dedicated bailer, which is stored inside the well. The bottom-filling bailer is typically constructed of stainless steel with a Teflon check valve and is attached to the well cap with a length of stainless steel cable. The bailer resides on the bottom of the well when not in use. Well purging using this bailer is performed as follows:

1. After the water level measurement has been taken, withdraw bailer from the well. Be sure to coil the cable so that none of it touches the ground. As the bailer is being removed from the well, water pressure forces the check valve closed and keeps the bore full.

2. Empty the water into the 5-gallon graduated bucket, observe the water, and note any characteristics, (i.e. incidental odor, color, turbidity).

3. Slowly lower the bailer into the well until it contacts the water. When the bailer is lowered into the well, the Teflon ball in the check valve allows water to fill the bailer bore from the bottom.

4. Allow the bailer to fill with water.

5. Repeat the process until the appropriate volume of water has been purged from the well or the well goes dry.

6. Discard purge water at the well head unless otherwise indicated in the "Status Column" of the Well ID Chart. (See Appendix D).

6.5 PURGING USING A DEDICATED WELL WIZARD™ PUMP

All deep wells, some shallow wells, and any GWES wells that are routinely sampled contain dedicated Well Wizard™ sampling pumps which are stored inside the well. Well Wizards™ are constructed of Teflon and stainless steel. They function using compressed air to cyclically operate a collapsible bladder and check valve system, which in essence squeezes water up the sample tubing. A surface controller box regulates the compressed air pressure and timing of the pressure\venting cycle.

To purge a well using the Well Wizard™, the following procedure is used:

1. After the water level measurement has been taken, connect the downspout to the well, directing the discharge into the graduated 5-gallon bucket.

2. Connect the compressed air supply line to the controller box and the controller box line to the well.

3. Start the gasoline-powered compressor and locate it as far downwind from the well as possible.

4. Adjust the pressure and the cycle time on the controller box. With the pressure on, the bladder expands, the check valve closes, and water is forced up the annulus of the pump. When the pressure is vented, the check valve remains open allowing water to flow into the bladder and annulus sections of the pump.

5. Collect water into the 5-gallon graduated bucket until the desired amount of water is removed or the well goes dry.

6. Discard purge water at the well head unless otherwise indicated in the "Status Column" of the Well ID Chart. (See Appendix D.)

7.0 SAMPLING PROCEDURES

7.1 SAMPLE COLLECTION

Prior to sampling, the sample point identity is recorded on the COC and FIF. The sample bottles, COC, and FIF forms are re-checked to ensure that all match with respect to sample point, parameter, and preservative.

Samples that are to be split with regulatory agencies are also checked for consistent sample point ID numbers and for other methods of identification if used by the agency.

The methods used for sampling a well with a dedicated Well Wizard™ pump or bailer are the same as those used to purge the well. The equipment used for sampling each well remains dedicated to that well. The type of equipment does not change between sampling events unless an emergency arises in which a Well Wizard™ does not function. A stock of new, clean bailers is kept on hand for such emergencies. A well must be sampled within 24 hours from the time purging was completed. If there is no water in the well, the well is declared dry for the sampling event and is not sampled until the next scheduled event. If there is sufficient water to measure field parameters and fill some of the bottles, sampling continues and bottles are filled according to Section 7.3. A well may be revisited and additional volume removed until the 24 hour time period expires.

Groundwater samples are poured directly from the Well Wizard™ or bailer into the sample bottles in a manner, which minimizes aeration of the sample. The Environmental Monitoring Group collects all groundwater samples. New, disposable, powderless PVC or latex gloves are worn at each sample point during sampling and changed when dirty, torn, etc.

When filling the sample bottles, the following procedures and precautions are followed:

1. Bottle caps are removed carefully so that the inside of the cap is not touched. Bottle caps are not placed on the ground or interchanged between sample bottles. Caps for VOC vials contain a Teflon-lined septum. The Teflon side of the septum must face the sample to prevent contamination of the sample through the septum.

2. The sample bottles are filled with a minimal amount of air contact, and without allowing the sampling equipment or personnel to contact the inside of the bottles.

   Tubing or hoses from the Well Wizards™ do not contact the inside of the sample bottles.

3. Sample bottles containing preservatives are filled with as little overflow as possible and are inverted to mix the preservative with the sample. If the required preservative(s) are not in the bottles, the bottles should be filled, leaving adequate space to add the preservative(s) later.

   A listing of preservatives is included in Appendix C-2 for reference. No substitutes for the chemical preservatives supplied are used as the reagents are special high grade and are metal free. Arrangements may be made with the laboratory to store additional preservatives at the site, if necessary. If substitutions are made from on-site storage, it is noted on the COC form.

4. VOC vials are filled so that they contain no headspace. These sample vials, therefore, need to be over-filled (water tension will maintain a convex water surface in the bottle). The caps for these vials are replaced gently, so as to prevent introducing air bubbles in the sample. Then, the vials are checked by inverting and snapping them sharply with a finger. If any air bubbles appear, the vial is opened, more water is added, and the process is repeated until no air bubbles are present. The vial is not emptied and refilled as this would result in the loss of the preservative, if present.

5. All sample bottles are filled and preserved as necessary. Upon completion of the sampling event, all samples are placed on ice and shipped via overnight courier. The VOC vials are not placed in direct contact with ice packs as the sample may freeze and break the vial.

6. Sample bottles, caps, or septa, which fall on the ground before filling, are thoroughly rinsed with sample water before being used or are discarded. All circumstances regarding dropped caps or bottles, and their subsequent rinsing and use, are noted on the FIF.

7.2 FIELD MEASUREMENTS

NOTE: The collection of "field data" (pH, Specific Conductance, and Temperature) was indefinitely suspended on January 9, 2001. (See S. Doleski to R. Park Zayatz.) Should the collection of this data be re-instated, the following procedures will be used.

Field measurements are taken immediately for specific conductance, pH, temperature, and additional parameters as required and are recorded on the FIF. A disposable beaker, which has been triple-rinsed with sample water, is used for these measurements. This beaker may be reused provided that it is thoroughly rinsed prior to each use.

All results are recorded on the FIF, noting units to 3 significant figures. Duplicate field measurements from a separate sample aliquot are made on 1 of every 10 samples or at least once per day.

The duplicate field measurements are recorded on the FIF in the comment section.

If the specific conductance or pH values obtained are not within the normal ranges, as stated on the Well ID Charts (Appendix D), the data is not discarded, rather, 3 additional measurements are taken to confirm the original value. All values are recorded on the FIF.

7.3 ORDER OF SAMPLE COLLECTION

In the event that parameters other than VOCs are required, the priority sequence of parameter collection during sampling is as follows:

Priority	Parameter
1	Volatile Organics
2	Purgeable Organic Carbon (POC)
3	Purgeable Organic Halogens (POX)
4	Acid and Base/Neutral Extractable Organics
5	Pesticides, Dibenzofurans, and Dibenzodioxins
6	Total Metals, Phenols, Cyanide, Other Inorganics
7	Radiologicals

7.4 DUPLICATE SAMPLES

Duplicate samples are submitted to TAL at the request of the Environmental Monitoring Manager. Currently, one duplicate sample is collected for approximately every 20 routine samples. When a duplicate sample is collected, it is identified as "DUP", receives the same analyses as other routine samples, and is used to demonstrate the reproducibility of the analytical results generated by TAL. The actual identity of the duplicate sample is noted in the comment section of the FIF.

7.5 TRIP BLANKS AND FIELD BLANKS

Trip blanks and field blanks are used as controls and/or external QA/QC samples. They indicate contamination that may have been introduced in the field, in transit to or from the sampling site, during bottle preparation, sample log-in, or sample storage at the laboratory. The blanks may also reflect contamination that may have occurred during the analytical process.

A trip blank is a sample of GC/MS Reagent Grade water that is prepared at the same location and time as the bottles that are to be used for sampling. The blank remains with the sample bottles while in transit to the site, during sampling, and during the return trip to the laboratory. Upon returning to the lab, the trip blank is analyzed for VOCs using the same QA/QC procedures as a sample.

A trip blanks is not to be opened until it is returned to the lab. If it is opened by accident, it must be noted on the COC form. . One trip blank is analyzed for every group of coolers shipped to the laboratory each day. A trip blank is reported in the Technical Report as a separate sample using "TB" as the sample point designation.

A field blank is similar to a trip blank, however, the field blank is prepared at the sampling location by filling empty bottles with GC/MS reagent grade water supplied by the laboratory. The location where the field blank is prepared is noted in the comment section of the FIF. The number of field blanks is dependent on the number of samples included in the sampling event. Currently, one field blank is collected and analyzed for VOCs only for every 20 routine samples collected.

Field blank results are reported in the laboratory's Technical Report as separate samples using "FB" as the sample point designation.

7.6 SAMPLE PACKAGING AND SHIPMENT PROCEDURES

After sampling, samples are placed in coolers containing wet ice or are otherwise refrigerated in a clean, secure area until shipping arrangements can be made.

There are two important reminders for repacking the coolers:

1. Glass should not be packed in contact with glass. Bubble wrap and wet ice are placed between the bottles.

2. Completed COC and FIF forms must be returned to the cooler <u>before</u> the cooler is sealed.

Once the samples have been placed on ice, the COC and FIF are completed. All paper work is then put into a plastic bag and placed inside the cooler. A member of the sampling team arranges for transportation to the laboratory. Coolers are delivered to a local lab on the day of the event or coolers are transported via overnight courier for receipt at the laboratory within 72 hours of sample collection; often samples are received within 24 hours. A listing of recommended holding times is contained in Appendix C-2 for reference. (NOTE: Although samples are chilled after sampling, it is a priority to ship the samples to the lab as soon as possible. As a result, some samples may arrive at the lab with a temperature of greater than 4°C. This lab notes this on the COC and these "warm" samples are analyzed as usual).

7.7 SAMPLE RECEIPT

Upon arrival at the laboratory, the samples are logged-in and COC procedures are maintained until the analyses are completed and reported.

Upon receipt of a sample, the laboratory records the following information on the Sample Receipt Log:

- Presence/absence of custody seal(s);
- Presence/absence of COC and FIF forms;

- Condition of samples (intact, broken, obvious movement during shipment, bubbles in VOC samples or trip blanks, OK, etc.);
- Presence/absence of sample point ID numbers, where applicable, job numbers on bottles, etc.;
- Notation of discrepancies between numbers on bottles received and those listed on the COC form;
- Temperature measurement of cooler;
- Notation of the preservation procedures.

Once a cooler is received at the laboratory, the Environmental Monitoring Group Manager is notified if any discrepancies are encountered by the Sample Receiving Group. Prompt notification is essential since analyses could be delayed beyond the allowable holding times.

8.0 FIELD RECORDS AND DOCUMENTATION

Standard COC and FIFs are filled out for each sample during a sampling event and are used to establish and document COC, sampling conditions, field measurements, and sampler's names, (see Appendix C-3). The original forms are sent with the samples to the laboratory and copies are included in the Technical Report when the analysis is complete. All forms are completed using permanent markers only.

The Environmental Monitoring Group maintains the Technical Report, including copies of the COC and FIF for easy reference. Analytical data is also permanently maintained in the site files.

8.1 CHAIN-OF-CUSTODY FORM

In order to maintain and document sample integrity, strict COC procedures are necessary.

From the time the empty sample bottles leave the laboratory until the analytical results are issued, the sample and/or sample containers are in the custody of trained CWM or laboratory personnel. In order to maintain COC, the samples must be either:

- In sight of the assigned custodian;
- Locked in a tamper-proof location; or
- Sealed with a tamper-proof seal.

A written record of sample bottle possession and transfer is maintained and documented on the COC form.

The COC form is signed with the date and time for the following activities:

- Whenever the cooler is transferred to the responsibility of another person.
- When the cooler is finally sealed for transport to the laboratory.

If samples collected from one sample point are placed in more than one cooler, a COC is placed in each cooler.

Additional information on the COC includes the sample point ID, the source code, the sample date, and sample start time. Any problems with the cooler or its contents are also noted on the form.

Upon receipt of the cooler at the laboratory, the date and time the seal is broken, the condition of the samples, and the temperature, are recorded on the COC form.

8.2 FIELD INFORMATION FORM

The FIF contains information regarding site and well conditions, purging and sampling procedures used, and field measurements. The FIF is filled out for each sample point and is enclosed along with the COC in the cooler. FIFs are filled out for each sample point, even if no sample is collected (i.e. dry wells, etc.). Information to be documented is as follows:

Sample Point - The source code and sample point ID, which are contained on the COC, are also recorded on the FIF.

Purging Information - This section includes the date and time the well was purged, the elapsed time for purging, the volume of water in the casing (gallons), and the total volume purged (gallons).

Sampling Information - This section documents the type of equipment used for purging and sampling as well as their materials of construction. If a code number does not correspond to the actual material, then a written description is provided.

Field Measurements - This section includes groundwater elevation. Additional parameters, (i.e. temperature, pH, specific conductance at 25^{o}C, and sample appearance) may also be included. The units and values of these measurements are noted.

Field Comments

This section may include field observations such as:

- Condition of the well and dedicated equipment;
- Weather conditions and upwind activities;
- Sample appearance - odor, color, and turbidity;
- Reference point for water level measurements;
- Location where field blank, duplicate, or regulatory split sample is prepared; if any.
- Purge volume calculations and comments (e.g. well went dry after 1 casing volume), and temperature conversions;
- Duplicate field measurement results;
- Other conditions such as potential safety or health hazards (i.e. presence of flying, stinging insects, etc.).

NOTE: When samples are split with regulatory agencies, note the condition of the bottles, preservatives used, etc., by the agency on the field form.

Sampling Certification - On the bottom of the FIF, the sampler must certify that the sampling procedures used were in accordance with applicable USEPA, NYSDEC, and Corporate Policies and Procedures as outlined in the WMI Manual for Groundwater Sampling and this document. The person signing the sampling certification must be present during the sampling event.

9.0 LABORATORY HANDLING AND ANALYTICAL PROTOCOLS

The following information provides a brief description of how samples are analyzed. Additional details are provided in Test America Laboratories, Inc. Quality Assurance Manual, February 2013.

9.1 LABORATORY PROCESSING PROCEDURES

The laboratory receives, logs-in samples, and maintains the COC procedures until the analyses are completed and reported, as described in Section 7.7. TAL uses an unique sample identification tracking system, which is initiated as the samples are logged in and continues as the samples proceed through the laboratory.

9.2 LABORATORY METHODOLOGIES

For the routine groundwater monitoring at the site, samples are analyzed for site specific indicator parameters (27 VOCs) listed in Condition L of Exhibit F, Schedule 1 of Module I of the Sitewide Permit. Reference list provided in Table 5. USEPA Method 8260 (Reference 14A) is used for the VOC analysis.

For the analysis of samples outside the routine monitoring program, the methodology will be specified by the Environmental Monitoring Manager and will depend on the Data Quality Objectives.

9.3 QUALITY ASSURANCE

Each analytical laboratory used for the analysis of groundwater samples has NYSDOH ELAP certification and CWM approval. In addition, QA is provided by following the standard analytical methods found in Reference 14A. Technical Reports contain analytical results and methodologies, dates sampled and received, sample identification, COC, and FIFs.

9.4 QUALITY CONTROL

Quality control is provided in the field through the collection of duplicate samples, field blanks, trip blanks, and duplicate field measurements.

Duplicate - collected as directed by Environmental Monitoring Manager, (see Section 7.4).

Field Blank - collected as directed by Environmental Monitoring Manager, (see Section 7.5).

Trip Blank - collected as directed by Environmental Monitoring Manager, (see Section 7.5).

Numerous laboratory and field quality control checks are performed. The following list includes the various checks used and the frequency at which the checks are performed.

BLANKS

- Method Blank or Laboratory Blank - Daily
- Reagent Blank - Daily
- Trip Blank - Determined by field staff (daily with VOC analysis)
- Field Blank - Determined by field staff, once per every 20 samples.

DUPLICATES

- Field Duplicate - Determined by field staff, once per every 20 samples.
- Laboratory Duplicate - once every 20 samples or daily, whichever is more frequent
- Matrix Spike Duplicate - once every 20 samples or daily, whichever is more frequent

SPIKES

- Spiked Blank - once every 20 samples or daily, whichever is more frequent
- Surrogate Spike - every sample and QC sample, (organic analyses only)
- Matrix Spike - once every 20 samples or daily, whichever is more frequent

INDEPENDENT QC CHECKS

- Laboratory Control Standards - daily
- Blind QC - each analyte at least quarterly
- Check Sample - as requested by Quality Assurance Manager
- Internal Standard - as method requires
- Standards - daily
- Control Standards - as method requires
- Method of Standard Additions - every sample that demonstrates matrix interference

9.5 REPORTING FORMAT

Upon completing the initial analysis and calculations, the data is evaluated by TAL personnel. If all data passes, it is entered into a computer data base system. All data is subjected to electronic QA validation prior to Lab Manager review and approval.

After Lab Operations and Quality Programs review, data packages are assembled and sent to the site via hard copy and electronic media. Included in the data package are the Technical Report, the Quality Report, and copies of the COC and FIF forms, (see Appendix C-4).

10.0 GENERAL DATA EVALUATION PROCEDURES FOR DETECTION MONITORING

As discussed in Section 3.4, 27 VOCs are used as Site Specific indicator parameters for this monitoring program. USEPA analytical procedures for VOC analysis specify very low method detection limits. At these low levels, there is often uncertainty in the significance of the detection of a compound and the source of the actual compound. Consequently, a low level detection of a compound cannot be reliably used to indicate that the compound is actually present in the groundwater. Therefore, the following general statistical evaluation procedure is employed.

RCRA and 373-2 regulations require the evaluation of groundwater monitoring data using t-statistics. The Poisson distribution of VOC data is used to calculate the t-prediction interval as an alternative Student's t-test. Development of the t-prediction interval for detection groundwater monitoring at the Model City site is presented in Reference 1. The procedure for applying the Prediction Interval (PI) to groundwater monitoring data involves the comparison of the data to three response triggers.

{**NOTE:** For the purpose of these evaluation procedures, a “J-value” is defined as the detection of a compound ABOVE the lab’s MDL, AT or BELOW their RL, in an undiluted sample. Although these “J-value” detections will be reported, they are NOT considered when evaluating data.}

This evaluation procedure is as follows:

1. The primary response trigger is the comparison of the summed total of the 27 Site Specific VOCs, (TVOC) from a single analysis to the PI. The PI for the Model City Facility, as derived from Field Blank data, has been calculated at 23 mg/l, excluding methylene chloride. If the TVOC is $\leq$ 23 mg/l, no further action is required and detection monitoring continues.

2. The second trigger evaluates the number of Site Specific VOC constituents observed in a single analysis and independent of summed total concentration. If the number of individual VOC constituents observed is ≤ 3, excluding methylene chloride, then no further action is required and detection monitoring continues.

3. The third trigger evaluates the current analysis with the two previous analyses. If there are no compounds detected in the current analysis that were reported in each of the previous two analyses, then no further action is required and detection monitoring continues. This trigger also excludes methylene chloride and is independent of concentration.

If the data fails under any one of the three triggers, an evaluation is performed to ascertain if the failure is the result of a release from a regulated unit. A schematic diagram of the groundwater evaluation procedure is shown on Figure 7.

10.1 DATA EVALUATION RESPONSE PROCEDURES

Evaluation of the detection groundwater monitoring well data is performed as a sequential review. The evaluation procedure includes several steps to collect and analyze data, as illustrated on Figure 7. Each step of the evaluation process is directed at defining if the data indicates leakage from the monitored unit. Each of the sequential steps is described in detail below.

Step 1 - This step is routine detection monitoring. Typically, it includes semiannual sampling for the Site Specific Indicator Parameters (27 VOCs), (see Table 5).

Step 2 - Within 7 days of receiving the detection monitoring results, the sum total of Site Specific VOCs, (TVOC), excluding methylene chloride, is calculated.

Step 3 - The results of the detection monitoring analyses are compared with the three response triggers outlined in Section 10.0. If the results pass each of the three triggers, then routine detection monitoring continues (Step 1).

If the results fail either of the first two triggers, the evaluation proceeds down the flow chart to evaluate the QA/QC data. If the results fail the third response trigger, then the evaluation proceeds down a separate branch of the flow chart (Steps 4a, 5a, 6a, and 7a).

Step 4 - If the data review indicates that the data is erroneous, the well returns to routine monitoring (Step 1) with a statement in the annual report that indicates the reasons for the erroneous data. If the data review indicates that the data is correct, the response proceeds down the chart.

Step 4a - If there is a failure of the third trigger, then the well is resampled within 14 days of receiving results.

Step 5 - Within 30 days of receiving the original detection monitoring results, the well must be resampled.

Step 5a - Within 30 days of receiving the results from the well resampling of Step 4a, CWM must meet with the NYSDEC to discuss the results.

Step 6 - Within 7 days of receiving the results from the resampling, the TVOC for the resampling must be calculated.

Step 6a - At the meeting with NYSDEC, a discussion will be held to determine if further action is required. If further action is not required, then the consecutive count (trigger three) will be reset to zero, and the well returns to routine monitoring (Step 1).

Step 7 - The results of the resampling are compared to the first and second data evaluation triggers. If there is no failure, the well returns to routine monitoring (Step 1) with a summary statement in the annual report. If the resampling data fails either of the first two triggers, the evaluation proceeds down the chart.

Step 7a - If further action is required from Step 6a, a source investigation plan must be submitted to NYSDEC within 30 days if required. From this step, the evaluation proceeds to Step 10 (evaluation of the source of detected compounds) on the main branch of the flow chart.

Step 8 - Within 7 days receiving the results of the resampling data, written notification of the failure of the response trigger(s) must be provided to NYSDEC. Within 30 days of receiving the results of the resampling, a plan must be submitted to NYSDEC to determine the source of the detected organic compounds. Within 90 days, or greater if agreed to by NYSDEC, of receiving the resampling data, a permit modification request must be submitted to NYSDEC.

Step 9 - Within 14 days of receiving the resampling results, the affected well and the adjacent wells that monitor the regulated/non-regulated unit must be sampled for NYSDEC Appendix 33 constituents. Adjacent wells are those wells immediately next to the well(s) with the detected compounds.
For example, if a shallow well is affected, the corresponding deep well and the shallow well on each side are the adjacent wells. For an affected deep well, the adjacent wells are the corresponding shallow well and the deep well on each side.

If compound(s) are detected in a well at which there is not a well or well pair on one side monitoring the same regulated/non-regulated unit, then the number of adjacent wells are reduced by one (or by one shallow well if compound(s) were detected in the saturated zone, and vice-versa for a deep well).

Step 10 - Upon approval of the source investigation plan from Step 8 by NYSDEC, an evaluation is made to determine the source of the detected compounds.

Step 11 - The purpose of evaluating the source of the detected compounds is to determine if the regulated/non-regulated unit is or is not the source. If the regulated/non-regulated unit is not the source of the detected compounds, CWM must submit a permit modification request to continue routine monitoring. If the source of the detected compounds is the regulated/non-regulated unit, CWM must submit a permit modification request to determine the maximum contaminant levels in order to determine the need for potential remedial action.

Step 12 - If the source of the compounds detected is not the regulated/non-regulated unit, an investigation is conducted to determine the source, rate and extent of the contamination, and what remedial action is required, if any.

10.2 WELL SPECIFIC DATA EVALUATION PROCEDURES

The data evaluation process for most wells follows the general procedures outlined in the preceding sections. However, there are exceptions to these general procedures. In general, the exception procedure is discussed below. The specific procedure for each exception well is presented in Table 2.

The following wells have Well Specific Data Evaluation Procedures due to the persistence of low level VOCs: W202S, W301S, W401S, W501S, P701S, P703S, W703S, W704S, W705S, W1002S, W1103S, W1104S, W1105S, W1106S, W1109S, W1207S, F5801S, TW01S, R105S, R106S, R107S, R204S, and R208S.

An investigation of the contamination found in each well has been performed. The conclusions of each investigation were previously reported to the Agencies.

The Well Specific Data Evaluation Procedure for evaluating any of the above-mentioned wells is similar to the general procedures previously outlined, however, the three response triggers have been modified slightly.

For each response trigger, the persistently occurring compounds are evaluated separately. For example, well W1103S has persistent levels of trichloroethene and 1,2-trans-dichloroethene, therefore, the TVOC to be compared with the 23 mg\L PI would not include these compounds (or methylene chloride). Rather, the concentration of each persistent compound is compared with an individual PI calculated from historical data from that particular well. A similar scenario is followed for the other two response triggers. Well specific PIs are presented on Table 2.

11.0 REPORTING

A Technical Report containing analytical results from all groundwater monitoring is submitted to NYSDEC and/or USEPA in Portable Document Format (PDF) within 90 days from the last day of the month during which sampling occurred. Included with the Technical Report is TAL's Quality Report. Copies of the COC and FIF forms are included in the Technical Report and are maintained on site. A sample of the report format is shown in Appendix C-4. In addition to the PDF format, NYSDEC has requested and receives all analytical data in Electronic Data Deliverable format within 30 days of receipt of the analytical results.

11.1 RECORDS

Records of all groundwater monitoring activities, including Technical Reports, Quality Reports, COCs, and FIFs are maintained at the Model City Facility. TAL also maintains a computer data base system which is backed-up daily for permanent storage.

REFERENCES

1. Golder Associates Inc., Revised Final Report, Groundwater Monitoring Program for New York State Part 373-2 Permit, Model City TSD Facility, Volumes I and II, April 1988.

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5. Golder Associates, Revised Groundwater Monitoring System, Model City, New York Facility, Volumes 1 and 2, March 1987.

6. Hvorslev, M.G., 1951, Time Lag and Soil Permeability in Groundwater Observations, U.S. Army Corps of Engineers, Waterways Exp. Sta. Bull. 36, Vicksburg, Miss.

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8. Golder Associates, Inc., Final Report on 1993 Hydrogeologic Characterization Update, Model City TSDR Facility, Model City, New York, Volumes I, II, and III, June 1993.

9. Golder Associates, Report on Residuals Management Unit One, Phase I, Groundwater Monitoring Program, Model City TSDR Facility, Model City, New York, November 1994.

10. Golder Associates, Preliminary Groundwater Monitoring Plan, Phase II Residuals Management Unit One, Phase I, Groundwater Monitoring Program, Model City TSDR Facility, Model City, New York, February 1995.

11. Golder Associates, As-Built Documentation and Construction Certification Interim Measures Systems, CWM Chemical Services, Model City TSDR Facility, Model City, New York, Volumes I and II, August 1991.

12. Golder Associates, Final Interim Report on As-Built Documentation and Construction Certification Interim Remedial Measures Process Area, Model City TSDR Facility, Model City, New York, Volumes I, II, and III, July 1993.

13. Wehran EMCON, Construction Documentation and Engineering Certification Report for the Process Area Interim Measures Second Phase, CWM Chemical Services, Inc., Model City, New York, March 1995.

14. USEPA, Methods for Chemical Analysis of Water and Waste, EPA-600-4-83-020, revised 1983.

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15. Golder Associates, 2012 Groundwater Level Interpretation Model City TSDR Facility, Model City, New York, February 2013.

16. Golder Associates, Addendum to Residuals Management Unit one, Groundwater Monitoring Program for Cells 5 and 6, March 1996.

17. Golder Associates, Addendum to Residuals Management Unit one, Groundwater Monitoring Program for Cells 7 and 8, July 1997.

REFERENCES
(continued)

18. Golder Associates, Records Documentation and Construction Certification, Corrective Measures at the PCB Warehouse, Model City TSD Facility, August 1997.

19. Golder Associates, Lagoons Area Groundwater Interceptor Trench Design, Model City TSD Facility, June 1997.

20. Test America Laboratories, Inc. Quality Assurance Manual February 2013.

21. Golder Associates, Report on Well Installation Corrective Measures Implementation, CWM Chemical Services, LLC, Model City, NY, August 2001.

22. Golder Associates, Addendum No. 6 to Residual Management Unit One Groundwater Monitoring Program, Model City TSD Facility, Model City, NY Revision 1, March 2004.

23. Ensol, Inc., Construction Documentation and Engineering Certification Report for the Process Area III Groundwater Interceptor Trench and Storage Tank T-8010, CWM Chemical Services, LLC Model City, New York, October 2012

24. Golder Associates, Record Documentation and Construction Certification For Process Area IV Extraction Wells CWM Chemical Services, LLC Model City, New York, March 2013

25. Golder Associates, Residuals Management Unit Two, Phase I Groundwater Monitoring Program, Model City TSD Facility, Model City, New York, January 2010.

26. Golder Associates, Addendum No. 1 to Residuals Management Unit Two, Phase I Groundwater Monitoring Program, Model City TSD Facility, Model City, New York, May 2011.

TABLE 2

GROUNDWATER MONITORING PROGRAM

(Revised 12/13)

ROUTINE PREDICTION INTERVAL

23 µg/l = total VOCs excluding methylene chloride.

ALTERNATE PREDICTION INTERVALS

ALT 1 {P701S, W1103S, W1104S, W1105S, W1106S} - 85 µg/l for 1,2-trans-dichloroethene, 260 µg/l for trichloroethene, and 23 µg/l total VOCs excluding methylene chloride, 1,2-t-dichloroethene, and trichloroethene.

ALT 2 {W301S} – 23 µg/l for 1,1-dichloroethene, 570 µg/l for 1,2-t-dichloroethene, 1200 µg/l for trichloroethene, and 23 µg/l total VOCs excluding methylene chloride, 1,1-dichloroethene, 1,2-t-dichloroethene, and trichloroethene.

ALT 3 {W703S} - 510 µg/l for chloroform, 400 µg/l for carbon tetrachloride, and 23 µg/l total VOCs excluding methylene chloride, chloroform and carbon tetrachloride.

ALT 4 {P703S} - 23 µg/l for 1,1-dichloroethane, 120 µg/l for 1,2-dichloroethane, 190 µg/l for ethylbenzene, 27 µg/l for chlorobenzene, and 23 µg/l total VOCs excluding methylene chloride, 1,1-dichloroethane, 1,2-dichloroethane, ethylbenzene, and chlorobenzene.

ALT 5 {W1002S} - 23 µg/l for sum of 1,1,1-trichloroethane, 1,1-dichloroethane, tetrachloroethene, toluene, and vinyl chloride. Sum total concentration of all VOCs excluding methylene chloride < 3 mg/l.

ALT 6 {TW01S, W202S, W501S} - 340 µg/l total VOCs excluding methylene chloride.

ALT 7 {F5801S} - 23 µg/l chlorobenzene and 23 µg/l total VOCs excluding methylene chloride and chlorobenzene**.**

ALT 8 {W1207S} - 50 µg/l for chloroform, 23 µg/l for carbon tetrachloride, and 23 µg/l total VOCs excluding methylene chloride, chloroform, and carbon tetrachloride**.**

ALT 9 {W705S} - 23 µg/l for 1,1,1-trichloroethane, 23 µg/l for 1,1-dichloroethane, and 23 µg/l total VOCs excluding methylene chloride, 1,1-dichloroethane, and 1,1,1-trichloroethane.

ALT 10 {W401S} - 23 µg/l for sum of acetone, methyl ethyl ketone, methyl isobutyl ketone, and 2-hexanone. Sum total concentration of all VOCs excluding methylene chloride and vinyl chloride < 3 mg/l.

ALT 11 {R106S} - 23 µg/l for 1,1-dichloroethane, 23 µg/l for vinyl chloride, and 23 µg/l total VOCs excluding methylene chloride, vinyl chloride, and 1,1-dichloroethane.

ALT 12 {R107S} - 23 µg/l for 1,1-dichloroethane, 23 µg/l for Trichloroethene, 23 µg/l for 1,2-dichloroethane, and 23 µg/l total VOCs excluding methylene chloride, trichloroethene, 1,2-dichloroethane, and 1,1-dichloroethane.

ALT 13 {R105S, W704S, and W1109S} – 23 µg/l for 1,1-dichloroethane and 23 µg/l total VOCs excluding methylene chloride and 1,1-dichloroethane

ALT 14 {R204S} – 23 µg/l for 1,1-dichloroethane, 23 µg/l for 1,2-dichloroethane, 23 µg/l for trichloroethene and 23 µg/l total VOCs excluding methylene chloride and 1,1-dichloroethane, 1,2-dichloroethane, and trichloroethene

ALT 15 {R208S} – 23 µg/l for benzene, 23 µg/l for ethylbenzene, 23 µg/l for toluene and 23 µg/l total VOCs excluding methylene chloride and benzene, ethylbenzene, and toluene

TABLE 2
GROUNDWATER MONITORING PROGRAM
(revised 12/18/13)

UNIT	WELL ID	FREQUENCY (or next scheduled event)	PARAMETERS	PREDICTION INTERVAL
SLF 1	W101S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	W101D	Semiannually	VOA	23 ug/l
	W102S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
SLF 2	W201S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	W201D	Semiannually	VOA	23 ug/l
	W202S	Semiannually	VOA	ALT 6
		Annually	RAD - see notes	
	W202UD	Semiannually	VOA	23 ug/l
	W202LD	Once per "ODD" Year	VOA	23 ug/l
SLF 3	W301S	Semiannually	VOA	ALT 2
		Annually	RAD - see notes	
	W301D	Semiannually	VOA	23 ug/l
	W303S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
SLF 4	W401S	Semiannually	VOA	ALT 10
	W401D	Semiannually	VOA	23 ug/l
	W402S	Semiannually	VOA	23 ug/l
SLF 5	W501S	Semiannually	VOA	ALT 6
	W501D	Semiannually	VOA	23 ug/l
	W502S	Semiannually	VOA	23 ug/l
SLF 6	W601S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	W601D	Semiannually	VOA	23 ug/l
	W602S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	W603S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
SLF 7	P701S	Semiannually	VOA	ALT 1
	P702S	Semiannually	Water Level Only	
	P703S	Semiannually	VOA	ALT 4
	W701S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	W701D	Semiannually	VOA	23 ug/l
	W702S	Semiannually	VOA	23 ug/l
	W702D	Semiannually	VOA	23 ug/l
	W703S	Semiannually	VOA	ALT 3
	W703D	Semiannually	VOA	23 ug/l
	W704S	Semiannually	VOA	ALT 13
		Annually	RAD - see notes	
		Every 5 years (2018)	RAD - see notes	
	W704D	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
		Every 5 years (2018)	RAD - see notes	
	W705S	Semiannually	VOA	ALT 9
	W705D	Semiannually	VOA	23 ug/l
SLF 10	P1001S	Semiannually	Water Level Only	
	P1002S	Semiannually	Water Level Only	
	W1001S	Semiannually	VOA	23 ug/l
	W1001D	Semiannually	VOA	23 ug/l
	W1002S	Semiannually	VOA	ALT 5
	W1003S	Semiannually	VOA	23 ug/l
	W1003D	Semiannually	VOA	23 ug/l
	W1004S	Semiannually	VOA	23 ug/l
	W1004D	Semiannually	VOA	23 ug/l

TABLE 2
GROUNDWATER MONITORING PROGRAM
(revised 12/18/13)

UNIT	WELL ID	FREQUENCY (or next scheduled event)	PARAMETERS	PREDICTION INTERVAL
SLF 11	P1102S	Semiannually	Water Level Only	
	P1103S	Semiannually	Water Level Only	
	P1104S	Semiannually	Water Level Only	
	P1105S	Semiannually	Water Level Only	
	W1101S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	W1101D	Semiannually	VOA	23 ug/l
	W1102S	Semiannually	VOA	23 ug/l
	W1102D	Semiannually	VOA	23 ug/l
	W1103S	Semiannually	VOA	ALT 1
	W1103D	Semiannually	VOA	23 ug/l
	W1104S	Semiannually	VOA	ALT 1
		Annually	RAD - see notes	
	W1104D	Semiannually	VOA	23 ug/l
	W1105S	Semiannually	VOA	ALT 1
	W1105D	Semiannually	VOA	23 ug/l
	W1106S	Semiannually	VOA	ALT 1
	W1106D	Semiannually	VOA	23 ug/l
	W1107S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
		Every 5 years (2018)	RAD - see notes	
	W1107D	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
		Every 5 years (2018)	RAD - see notes	
	W1108S	Semiannually	VOA	23 ug/l
	W1108D	Semiannually	VOA	23 ug/l
	W1109S	Semiannually	VOA	ALT 13
	W1109D	Semiannually	VOA	23 ug/l
	GZR01S	Semiannually	VOA	23 ug/l
	GZR02S	Semiannually	VOA	23 ug/l
	GZR03S	Semiannually	VOA	23 ug/l
	GZR04S	Semiannually	VOA	23 ug/l
SLF 12	P1201S	Semiannually	Water Level Only	
	W1201S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
		Every 5 years (2018)	RAD - see notes	
	W121UD	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
		Every 5 years (2018)	RAD - see notes	
	W121LD	Once per "ODD" Year	VOA	23 ug/l
	W1202S	Semiannually	VOA	23 ug/l
	W122UD	Semiannually	VOA	23 ug/l
	W122LD	Once per "ODD" Year	VOA	23 ug/l
	W1203S	Semiannually	VOA	23 ug/l
	W123UD	Semiannually	VOA	23 ug/l
	W123LD	Once per "ODD" Year	VOA	23 ug/l
	W1204S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
		Every 5 years (2018)	RAD - see notes	
	W1204D	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
		Every 5 years (2018)	RAD - see notes	
	W1205S	Semiannually	VOA	23 ug/l
	W1205D	Semiannually	VOA	23 ug/l
	W1206S	Semiannually	VOA	23 ug/l
	W1206D	Semiannually	VOA	23 ug/l
	W1207S	Semiannually	VOA	ALT 8
		Annually	RAD - see notes	
		Every 5 years (2018)	RAD - see notes	

TABLE 2
GROUNDWATER MONITORING PROGRAM
(revised 12/18/13)

UNIT	WELL ID	FREQUENCY (or next scheduled event)	PARAMETERS	PREDICTION INTERVAL
SLF 12 (continued)	W1207D	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
		Every 5 years (2018)	RAD - see notes	
	W1208S	Semiannually	VOA	23 ug/l
	W128UD	Semiannually	VOA	23 ug/l
	W128LD	Once per "ODD" Year	VOA	23 ug/l
RMU-1	R1P01S	Semiannually	Water Level Only	
	R1P02S	Semiannually	Water Level Only	
	R1P03S	Semiannually	Water Level Only	
	R1P04S	Semiannually	Water Level Only	
	R1P05S	Semiannually	Water Level Only	
	R1P06S	Well removed in 2008.		
	R1P07S	Semiannually	Water Level Only	
	R1P08S	Semiannually	Water Level Only	
	R1P09S	Semiannually	Water Level Only	
	R1P10S	Semiannually	Water Level Only	
	R101S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	R101D	Semiannually	VOA	23 ug/l
	R102S	Semiannually	VOA	Report Only.
	R102SR	Semiannually	VOA	23 ug/l
	R102D	Semiannually	VOA	23 ug/l
	R103S	Semiannually	VOA	23 ug/l
	R103D	Semiannually	VOA	23 ug/l
	R104S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	R104D	Semiannually	VOA	23 ug/l
	R105S	Semiannually	VOA	ALT 13
	R105D	Semiannually	VOA	23 ug/l
	R106S	Semiannually	VOA	ALT 11
	R106D	Semiannually	VOA	23 ug/l
	R107S	Semiannually	VOA	ALT 12
		Annually	RAD - see notes	
	R107D	Semiannually	VOA	23 ug/l
	R108S	Semiannually	VOA	Report Only.
	R1N08S	Semiannually	VOA	23 ug/l
	R108D	Semiannually	VOA	23 ug/l
	R109S	Semiannually	VOA	23 ug/l
	R109D	Semiannually	VOA	23 ug/l
	R110S	Semiannually	VOA	Report Only.
	R1N10S	Semiannually	VOA	23 ug/l
	R110D	Semiannually	VOA	23 ug/l
	R111S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	R111D	Semiannually	VOA	23 ug/l
	R112S	Semiannually	VOA	23 ug/l
	R113S	Semiannually	VOA	23 ug/l
	R114S	Semiannually	VOA	23 ug/l
	R114D	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	R115S	Semiannually	VOA	23 ug/l
	R116S	Semiannually	VOA	23 ug/l
	R116D	Semiannually	VOA	23 ug/l
	R117UD	Semiannually	Water Level Only	
	R117LD	Semiannually	Water Level Only	
	R118S	Semiannually	VOA	23 ug/l
	R118D	Semiannually	VOA	23 ug/l
	R119D	Semiannually	Water Level Only	
	R120D	Semiannually	Water Level Only	
	R121D	Semiannually	Water Level Only	
	R122D	Semiannually	Water Level Only	
	R123D	Well removed in 2008.		

TABLE 2
GROUNDWATER MONITORING PROGRAM
(revised 12/18/13)

UNIT	WELL ID	FREQUENCY (or next scheduled event)	PARAMETERS	PREDICTION INTERVAL
RMU-1 (continued)	R124D	Well removed in 2008.		
	R125D	Semiannually	VOA	23 ug/l
	R126D	Semiannually	VOA	23 ug/l
	R127D	Semiannually	VOA	23 ug/l
	R128D	Semiannually	VOA	23 ug/l
	R129D	Semiannually	VOA	23 ug/l
	R130D	Semiannually	VOA	23 ug/l
	R131D	Semiannually	VOA	23 ug/l
	R132D	Semiannually	VOA	23 ug/l
	R133D	Semiannually	VOA	23 ug/l
	R134D	Semiannually	VOA	23 ug/l
	R135D	Semiannually	VOA	23 ug/l
RMU-2	R2P01S	Semiannually	Water Level Only	
	R201SR	Semiannually	VOA	23 ug/l
	R201DR	Semiannually	VOA	23 ug/l
	R204S	Semiannually	VOA	ALT 14
	R204D	Semiannually	VOA	23 ug/l
	R205S	Semiannually	VOA	23 ug/l
	R205D	Semiannually	VOA	23 ug/l
	R206S	Semiannually	VOA	23 ug/l
	R206D	Semiannually	VOA	23 ug/l
	R207S	Semiannually	VOA	23 ug/l
	R207D	Semiannually	VOA	23 ug/l
	R208S	Semiannually	VOA	ALT 15
	R208D	Semiannually	VOA	23 ug/l
	R209S	Semiannually	VOA	23 ug/l
	R209D	Semiannually	VOA	23 ug/l
	R210S	Semiannually	VOA	23 ug/l
	R210D	Semiannually	VOA	23 ug/l
	R211S	Semiannually	VOA	23 ug/l
	R211D	Semiannually	VOA	23 ug/l
	R212S	Semiannually	VOA	23 ug/l
	R212UD	Semiannually	VOA	23 ug/l
	R212LD	Once per "ODD" Year	VOA	23 ug/l
	R213S	Semiannually	VOA	23 ug/l
	R213D	Semiannually	VOA	23 ug/l
	R214S	Semiannually	VOA	23 ug/l
	R214D	Semiannually	VOA	23 ug/l
	R215S	Semiannually	VOA	23 ug/l
	R215D	Semiannually	VOA	23 ug/l
	R216S	Semiannually	VOA	23 ug/l
	R216D	Semiannually	VOA	23 ug/l
BACKGROUND	BW01S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	BW01D	Semiannually	VOA	23 ug/l
	BW03S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	BW03D	Semiannually	VOA	23 ug/l
	BW04S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	BW04D	Semiannually	VOA	23 ug/l
	BW05S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	BW05D	Semiannually	VOA	23 ug/l

TABLE 2
GROUNDWATER MONITORING PROGRAM
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UNIT	WELL ID	FREQUENCY (or next scheduled event)	PARAMETERS	PREDICTION INTERVAL
FAC PONDS 1 & 2	F101S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	F102S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	F102D	Semiannually	VOA	23 ug/l
	F103S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
FAC POND 3	F301S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	F302S	Semiannually	VOA	23 ug/l
	F302D	Semiannually	VOA	23 ug/l
FAC POND 8	F801S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	F802S	Semiannually	VOA	23 ug/l
	F802UD	Semiannually	VOA	23 ug/l
	F802LD	Once per "ODD" Year	VOA	23 ug/l
FAC POND 5	F501S	Semiannually	VOA	23 ug/l
	F501D	Semiannually	VOA	23 ug/l
	F502S	Semiannually	VOA	23 ug/l
TANK 58	F5801S	Semiannually	VOA	ALT 7
		Annually	RAD - see notes	
	F5801D	Semiannually	VOA	23 ug/l
	F5802S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
EAST/WEST SALTS AREA	TW01S	Semiannually	VOA	ALT 6
		Annually	RAD - see notes	
	TW02S	Semiannually	VOA	23 ug/l
	TW03S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	TW03D	Semiannually	VOA	23 ug/l
	WS01S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	TP04S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
NORTH SALTS	TW12S	Semiannually	VOA	23 ug/l
		Annually	RAD - see notes	
	TW13S	Semiannually	VOA	23 ug/l
	TW14S	Semiannually	VOA	23 ug/l
	TW15S	Semiannually	VOA	23 ug/l
	TW15D	Semiannually	VOA	23 ug/l
INVESTIGATION WELLS	GDA01S	Annually	VOA	23 ug/l
	RR01S	Annually	VOA	23 ug/l
	TW21S	Semiannually	VOA	Report Only.
	TW24S	Semiannually	VOA	Report Only.
	TW27S	Semiannually	VOA	Report Only.
	TW29S	Semiannually	VOA	Report Only.
	W1209S	Annually	VOA + RAD - see notes	23 ug/l
	GROUNDWATER EXTRACTION SYSTEMS			
	WEST DRUM AREA			
GROUNDWATER WELLS	TW16S	Varies	Water Level + DNAPL Removal	
	TW17S	Varies	Water Level + DNAPL Removal	
	TW18S	Annually	Water Level	
	TW19S	Semiannually	VOA	Report Only.
	TW20S	Annually	RAD - see notes	
	WDA01S	Semiannually	VOA	23 ug/l
	WDA01D	Semiannually	VOA	23 ug/l

TABLE 2
GROUNDWATER MONITORING PROGRAM
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UNIT	WELL ID	FREQUENCY (or next scheduled event)	PARAMETERS	PREDICTION INTERVAL
AQUEOUS SUMPS	AQ01	Quarterly	Water Level Only.	
	AQ02	Quarterly	Water Level Only.	
		2015, 2018, 2021, etc.	TCL	Report Only.
	AQ03	Quarterly	Water Level Only.	
	AQ04	Quarterly	Water Level Only.	
	AQ05	Quarterly	Water Level Only.	
		2016, 2019, 2022, etc.	TCL	Report Only.
	AQ06	Quarterly	Water Level Only.	
	AQ07	Quarterly	Water Level Only.	
		2014, 2017, 2020 etc.	TCL	Report Only.
DNAPL SUMPS	DS01	Quarterly	Water Level + DNAPL Check.	
	DS02	Quarterly	Water Level + DNAPL Check.	
	DS03	Quarterly	Water Level + DNAPL Check.	
	DS04	Quarterly	Water Level + DNAPL Check.	
	DS05	Quarterly	Water Level + DNAPL Check.	
	DS06	Quarterly	Water Level + DNAPL Check.	
	DS07	Quarterly	Water Level + DNAPL Check.	
	DS08	Quarterly	Water Level + DNAPL Check.	
DNAPL SUMPS (continued)	DS09	Quarterly	Water Level + DNAPL Check.	
	DS10	Quarterly	Water Level + DNAPL Check.	
	DS11	Quarterly	Water Level + DNAPL Check.	
	DS12	Quarterly	Water Level + DNAPL Check.	
	DS13	Quarterly	Water Level + DNAPL Check.	
	DS14	Quarterly	Water Level + DNAPL Check.	
	DS15	Quarterly	Water Level + DNAPL Check.	
	DS16	Quarterly	Water Level + DNAPL Check.	
	DS17	Quarterly	Water Level + DNAPL Check.	
	DS18	Quarterly	Water Level + DNAPL Check.	
	DS19	Quarterly	Water Level + DNAPL Check.	
PERFORMANCE PIEZOMETERS	PAN04	Quarterly	Water Level Only	
	PAN03	Quarterly	Water Level Only	
	PAN02	Quarterly	Water Level Only	
	PAN01	Quarterly	Water Level Only	
	PA	Quarterly	Water Level Only	
PERFORMANCE PIEZOMETERS (continued)	PAS01	Quarterly	Water Level Only	
	PAS02	Quarterly	Water Level Only	
	PAS03	Quarterly	Water Level Only	
	PAS04	Quarterly	Water Level Only	
	PBN04	Quarterly	Water Level Only	
	PBN03	Quarterly	Water Level Only	
	PBN02	Quarterly	Water Level Only	
	PBN01	Quarterly	Water Level Only	
	PB	Quarterly	Water Level Only	
	PBS01	Quarterly	Water Level Only	
	PBS02	Quarterly	Water Level Only	
	PBS03	Quarterly	Water Level Only	
	PBS04	Quarterly	Water Level Only	
	LAGOONS/PROCESS AREAS			
GROUNDWATER WELLS	LMS01S	Quarterly	Water Level Only	
		Semiannually	VOA	Report Only.
	LMS01D	Semiannually	VOA	Report Only.
	LMS02S	Quarterly	Water Level Only	
		Semiannually	VOA	Report Only.
	LMS02D	Semiannually	VOA	Report Only.
	LMS03S	Quarterly	Water Level Only	
		Semiannually	VOA	Report Only.
	LMS03D	Semiannually	VOA	Report Only.
	LMS04S	Quarterly	Water Level Only	
		Semiannually	VOA	Report Only.

TABLE 2
GROUNDWATER MONITORING PROGRAM
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UNIT	WELL ID	FREQUENCY (or next scheduled event)	PARAMETERS	PREDICTION INTERVAL
	LAGOONS/PROCESS AREAS			
GROUNDWATER WELLS (continued)	TW11S	Quarterly	Water Level Only	
		Semiannually	VOA	Report Only.
	TW30D	Semiannually	VOA	Report Only.
	R202S	Semiannually	VOA	Report Only.
AQUEOUS SUMPS	AQ08	Quarterly	Water Level Only	
	AQ09	Quarterly	Water Level Only	
		2015, 2018, 2021 etc.	TCL	Report Only.
	AQ10	Quarterly	Water Level Only	
	AQ11	Quarterly	Water Level Only	
	AQ12	Quarterly	Water Level Only	
		2016, 2019, 2022 etc.	TCL	Report Only.
	AQ13W	Quarterly	Water Level Only	
		Once per "ODD" Year	TCL	Report Only.
	AQ14E	Quarterly	Water Level Only	
		Once per "EVEN" Year	TCL	Report Only.
	AQ15	Quarterly	Water Level Only	
DNAPL SUMPS	DS20	Quarterly	Water Level + DNAPL Check.	
	DS21	Quarterly	Water Level + DNAPL Check.	
	DS22	Quarterly	Water Level + DNAPL Check.	
	DS23	Quarterly	Water Level + DNAPL Check.	
	DS26	Quarterly	Water Level + DNAPL Check.	
	DS27	Quarterly	Water Level + DNAPL Check.	
	DS28	Quarterly	Water Level + DNAPL Check.	
	DS29	Quarterly	Water Level + DNAPL Check.	
EXTRACTION WELLS	EW08	Quarterly	Water Level Only	
	EW09	Quarterly	Water Level Only	
	EW11	Quarterly	Water Level Only	
	EW12	Quarterly	Water Level Only	
		2014, 2017, 2020 etc.	TCL	Report Only.
	EW14	Quarterly	Water Level Only	
	EW17	Annually	Water Level Only	
	EW18	Annually	Water Level Only	
COMBINATION DNAPL SUMPS/ EXTRACTION WELLS	EW10/DS24	Quarterly	Water Level + DNAPL Removal.	
	EW13/DS25	Quarterly	Water Level + DNAPL Removal.	
PERFORMANCE PIEZOMETERS	PCN03	Quarterly	Water Level Only	
	PCN02	Quarterly	Water Level Only	
	PCN01	Quarterly	Water Level Only	
	PC	Quarterly	Water Level Only	
	PCS01	Quarterly	Water Level Only	
	PCS02	Quarterly	Water Level Only	
	PCS03	Quarterly	Water Level Only	
PERFORMANCE PIEZOMETERS (continued)	PDN01	Quarterly	Water Level Only	
	PDN02	Quarterly	Water Level Only	
	PDN03	Quarterly	Water Level Only	
	PLM101	Quarterly	Water Level Only	
	PLM201	Quarterly	Water Level Only	
	PLM202	Quarterly	Water Level Only	
	PLM301	Quarterly	Water Level Only	
	PFN02	Quarterly	Water Level Only	
	PFN01	Quarterly	Water Level Only	
	PF	Quarterly	Water Level Only	
	PFS01	Quarterly	Water Level Only	
	PFS02	Quarterly	Water Level Only	

TABLE 2
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UNIT	WELL ID	FREQUENCY (or next scheduled event)	PARAMETERS	PREDICTION INTERVAL
TANKS	T-8009	Annually	VOA	Report Only.
	T-8010	Semiannually	VOA	Report Only.
		AREA SOUTH OF SLF 3		
GROUNDWATER WELL	W302S	Quarterly	Water Level Only	
		Annually	TCL + RAD - see list	Report Only.
EXTRACTION WELLS	EW06	Quarterly	Water Level Only	
		Once per "EVEN" Year	TCL	Report Only.
	EW07	Quarterly	Water Level Only	
		Once per "ODD" Year	TCL	Report Only.
PERFORMANCE PIEZOMETERS	PEW701	Quarterly	Water Level Only	
	PEW702	Quarterly	Water Level Only	
	PEW703	Quarterly	Water Level Only	
	PEW704	Quarterly	Water Level Only	
		P1202S AREA		
GROUNDWATER WELLS	TW25S	Semiannually	Water Level Only	
	TW26S	Semiannually	VOA	Report Only.
	P1202S	Semiannually	Water Level Only	
PERFORMANCE PIEZOMETERS	P1203S	Semiannually	Water Level Only	
	P1204S	Semiannually	Water Level Only	
	P1205S	Semiannually	Water Level Only	
	P1206S	Semiannually	Water Level Only	
TANK	T-8006	Semiannually	VOA	Report Only.
		BW02S AREA		
GROUNDWATER WELLS	BW02S	Semiannually	Water Level Only	
	BW02D	Annually	VOA	Report Only.
PERFORMANCE PIEZOMETERS	BWP01S	Semiannually	Water Level Only	
	BWP02S	Semiannually	Water Level Only	
	BWP03S	Semiannually	Water Level Only	
	BWP04S	Semiannually	Water Level Only	
TANK	T-8005	Semiannually	VOA	Report Only.
		PCB WAREHOUSE AREA		
EXTRACTION WELLS	EW15	Semiannually	Water Level Only	
	EW16	Semiannually	Water Level Only	
PERFORMANCE PIEZOMETERS	PE01S	Semiannually	Water Level Only	
	PE02S	Semiannually	Water Level Only	
	PE03S	Semiannually	Water Level Only	
TANK	T-8007	Semiannually	VOA	Report Only.

NOTES:
1. VOA = Site Specific Priority Pollutant Volatile Organics, (see Table 5).
2. TCL = Superfund Target Compound List, (see Table 6).
3. DNAPL Check = a physical check to determine the presence of any Dense, Non-Aqueous Phase Liquids.
4. All groundwater wells have Groundwater Elevation measurements made any time that they are sampled for routine analytical parameters.
5. Water Level collection frequencies for selected Groundwater Extraction System Sample Points are quarterly *during the operational period.* As these systems do not operate in the first quarter of a given year, no water levels are collected.
6. RAD - Annually = Isotopic-U, Isotopic-Th, Ra^{-226}, Ra^{-228}, and Gamma Spectroscopy Analysis.
7. RAD - Every 5 Years = Gross Alpha + Gross Beta on filtered and unfiltered samples.

Table 3
Well Construction Summary

Well ID	Monitoring Unit	Zone (5)	Casing Material	Sampler Type (6)	Date Installed	Ground Elevation (1) (ft/msl)	Installed Elevation (2) (ft/msl)	Northing	Easting	Borehole Depth (3) (ft)	Top of Screen (4) (ft)	Bottom of Screen (4) (ft)	Sand Length (ft)	Seal Length
AQ01	GWES	1	SS	None	10/9/1990	317.70	320.01	9213.60	8588.92	21.4	17.5	19.4	12.9	
AQ02	GWES	1	SS	Well Wiz	10/10/1990	317.30	319.59	9369.01	8584.92	20.5	16.9	18.8	12.2	
AQ03	GWES	1	SS	None	10/12/1990	316.10	318.51	9442.42	8668.23	19.7	16.3	18.2	13.6	
AQ04	GWES	1	SS	None	10/13/1990	316.00	318.55	9442.70	8812.08	19.3	16.0	17.9	14.3	
AQ05	GWES	1	SS	Well Wiz	10/14/1990	315.80	318.46	9439.27	8943.94	17.1	14.3	16.2	12.7	
AQ06	GWES	1	SS	None	10/15/1990	317.50	319.86	9620.15	8797.68	20.6	17.5	19.4	16.0	
AQ07	GWES	1	SS	Well Wiz	10/15/1990	316.70	319.38	9515.35	8802.41	18.9	16.5	18.4	14.4	
AQ08	GWES	1	SS	None	10/15/1992	321.30	323.65	9471.40	9663.17	21.8	19.5	21.5	16.3	1.0
AQ09	GWES	1	SS	Well Wiz	10/9/1992	319.90	322.99	9469.59	9809.42	27.0	24.3	25.9	21.0	3.3
AQ10	GWES	1	SS	None	10/13/1992	318.80	321.31	9469.69	9954.75	27.7	24.8	26.8	23.2	2.0
AQ11	GWES	1	SS	None	10/12/1994	321.16	323.59	9468.74	9421.24	17.0	10.9	15.0	10.4	3.6
AQ12	GWES	1	SS	Well Wiz	10/13/1994	321.23	323.40	9467.55	9370.55	17.0	11.1	16.1	10.2	3.5
AQ13W	GWES	1	HDPE	Well Wiz	11/1/1997	320.60	321.10	9685.00	8800.00	0.0	20.3	24.3	0.0	0.0
AQ14E	GWES	1	HDPE	Well Wiz	11/1/1997	319.30	321.38	9482.00	9980.00	25.5	20.6	25.1	0.0	0.0
AQ15	GWES	1	HDPE	Well Wiz	7/10/2012	320.23	323.95	9479.63	10201.04	15.3	10.0	15.0	0.0	0.0
B34A	Background	3	SS	None	1/16/1984	320.91	322.14	0.00	0.00	51.5	37.9	42.9	16.0	4.0
BW01D	Background	3	SS	Well Wiz	4/30/1986	319.23	321.13	7791.26	8049.69	39.7	36.0	38.6	6.1	4.0
BW01S	Background	1	SS	Bailer	4/30/1986	319.36	321.56	7793.39	8045.29	16.0	5.7	13.6	8.0	4.0
BW02D	Background	3	SS	Well Wiz	4/30/1986	320.77	322.55	7720.60	11220.67	43.0	36.1	41.0	8.4	4.2
BW02S	GWES	1	SS	Well Wiz	5/5/1986	320.60	322.09	7719.45	11225.75	16.0	6.4	14.3	10.2	4.3
BW03D	Background	3	SS	Well Wiz	5/5/1986	319.79	320.85	7874.97	12677.77	50.3	38.8	49.4	13.3	4.0
BW03S	Background	1	SS	Bailer	5/6/1986	319.35	322.77	7870.92	12674.59	12.0	4.4	10.0	6.5	2.5
BW04D	Background	3	SS	Well Wiz	11/20/1987	320.60	323.52	7854.50	10249.20	39.2	35.1	37.4	6.2	3.5
BW04S	Background	1	SS	Bailer	11/6/1987	320.50	323.49	7853.90	10253.50	15.0	7.1	14.7	8.2	4.6
BW05D	Background	3	SS	Well Wiz	11/16/1987	318.90	321.63	7708.30	11544.40	41.7	37.7	40.0	6.5	3.2
BW05S	Background	1	SS	Bailer	11/12/1987	318.80	321.08	7707.80	11540.50	16.0	8.0	15.3	9.7	3.1
BWP01S	GWES	1	PVC	None	8/11/1994	320.52	322.74	7753.66	11220.64	16.0	5.5	15.5	11.5	1.5
BWP02S	GWES	1	PVC	None	10/18/1994	320.84	323.01	7793.00	11208.50	15.0	9.5	14.5	6.0	3.0
BWP03S	GWES	1	PVC	None	10/19/1994	320.75	322.89	7798.50	11204.00	15.0	9.5	14.5	6.0	3.0
BWP04S	GWES	1	PVC	None	10/19/1994	321.10	323.24	7806.00	11197.00	15.0	9.5	14.5	6.0	3.0
DS01	GWES	1	SS	None	11/9/1990	317.20	318.74	9195.83	8588.35	24.8	21.8	24.5	16.6	
DS02	GWES	1	SS	None	11/5/1990	317.20	318.86	9227.33	8587.93	24.4	20.9	23.6	14.7	

Table 3
Well Construction Summary

Well ID	Monitoring Unit	Zone (5)	Casing Material	Sampler Type (6)	Date Installed	Ground Elevation (1) (ft/msl)	Installed Elevation (2) (ft/msl)	Northing	Easting	Borehole Depth (3) (ft)	Top of Screen (4) (ft)	Bottom of Screen (4) (ft)	Sand Length (ft)	Seal Length
DS03	GWES	1	SS	None	11/6/1990	317.10	318.75	9282.14	8586.69	23.3	19.1	21.3	12.7	
DS04	GWES	1	SS	None	11/6/1990	317.50	319.27	9322.53	8585.54	24.1	20.0	22.0	13.5	
DS05	GWES	1	SS	None	11/7/1990	317.50	318.55	9358.64	8584.74	23.8	19.5	21.9	13.4	
DS06	GWES	1	SS	None	11/7/1990	317.30	319.29	9400.80	8584.92	22.9	19.8	21.8	13.5	
DS07	GWES	1	SS	None	11/16/1990	317.40	318.84	9432.23	8585.20	27.2	24.4	26.3	20.0	
DS08	GWES	1	SS	None	11/13/1990	318.60	320.87	9443.49	8618.67	24.0	20.1	22.1	17.5	
DS09	GWES	1	SS	None	11/9/1990	316.50	318.24	9442.46	8652.98	23.1	19.2	21.2	16.0	
DS10	GWES	1	SS	None	11/9/1990	316.20	317.55	9442.67	8696.86	21.8	18.6	20.6	16.0	
DS11	GWES	1	SS	None	11/21/1990	316.30	317.91	9442.37	8772.47	23.2	20.7	22.7	18.3	
DS12	GWES	1	SS	None	11/21/1990	316.20	317.12	9442.10	8826.73	21.2	19.1	21.1	17.0	
DS13	GWES	1	SS	None	11/12/1990	316.10	317.64	9440.67	8859.42	22.3	18.4	20.4	15.8	
DS14	GWES	1	SS	None	11/15/1990	315.90	317.23	9438.89	8923.76	21.7	19.5	21.5	17.3	
DS15	GWES	1	SS	None	11/26/1990	316.10	318.13	9439.98	8959.16	21.3	19.0	21.0	17.1	
DS16	GWES	1	SS	None	11/26/1990	316.00	318.19	9441.23	8993.78	21.7	18.7	20.7	16.5	
DS17	GWES	1	SS	None	11/14/1990	317.20	318.96	9609.46	8797.84	22.9	20.0	22.0	16.0	
DS18	GWES	1	SS	None	11/19/1990	316.70	318.99	9530.16	8801.01	22.3	19.6	21.6	16.9	
DS19	GWES	1	SS	None	11/14/1990	316.70	318.54	9492.44	8802.94	20.9	18.1	20.1	13.4	
DS20	GWES	1	SS	None	10/16/1992	321.20	323.22	9470.47	9696.04	25.0	22.9	25.0	19.0	1.0
DS21	GWES	1	SS	None	10/16/1992	320.40	322.02	9470.78	9736.22	24.2	22.7	24.2	18.2	3.0
DS22	GWES	1	SS	None	10/16/1992	319.80	321.61	9469.24	9794.58	28.3	26.7	28.0	22.3	3.0
DS23	GWES	1	SS	None	10/16/1992	318.90	321.10	9469.06	9946.61	29.4	27.8	29.4	23.4	3.0
DS26	GWES	1	SS	None	10/13/1994	321.30	323.56	9467.85	9396.56	18.5	12.7	17.7	10.9	3.0
DS27	GWES	1	ss	None	12/4/1997	319.41	321.91	9495.63	9974.62	16.0	5.5	15.5	12.0	1.1
DS28	GWES	1	ss	None	12/11/1997	319.58	322.08	9605.19	9971.93	21.3	10.8	20.8	7.3	1.0
DS29	GWES	1	ss	None	12/11/1997	318.11	320.61	9845.82	9476.35	25.5	10.0	25.0	21.5	1.0
EW06	GWES	1	SS	Well Wiz	11/16/1990	319.30	320.19	8197.21	9353.70	17.1	9.1	16.1	9.9	5.0
EW07	GWES	1	SS	Well Wiz	11/15/1990	319.20	320.60	8189.23	9328.62	17.5	9.5	16.5	9.8	4.0
EW08	GWES	1	SS	None	9/21/1994	321.42	323.73	9499.22	9618.36	17.0	11.0	17.0	8.0	3.0
EW09	GWES	1	SS	None	9/23/1994	320.54	323.04	9499.90	9594.71	18.0	10.0	18.0	8.0	3.0
EW10	GWES	1	SS	None	9/22/1994	320.43	322.85	9498.27	9574.71	19.5	13.5	19.5	6.5	3.0
EW11	GWES	1	SS	None	9/20/1994	320.03	322.43	9498.37	9544.39	13.5	7.5	12.5	7.0	3.0
EW12	GWES	1	SS	Well Wiz	9/19/1994	319.86	322.17	9497.41	9515.15	16.0	10.5	15.5	7.0	3.0

Table 3
Well Construction Summary

Well ID	Monitoring Unit	Zone (5)	Casing Material	Sampler Type (6)	Date Installed	Ground Elevation (1) (ft/msl)	Installed Elevation (2) (ft/msl)	Northing	Easting	Borehole Depth (3) (ft)	Top of Screen (4) (ft)	Bottom of Screen (4) (ft)	Sand Length (ft)	Seal Length
EW13	GWES	1	SS	None	9/14/1994	319.49	321.95	9497.41	9484.48	18.5	11.5	18.5	7.0	3.0
EW14	GWES	1	SS	None	9/14/1994		321.76	9496.26	9466.18	17.0	12.0	17.0	7.0	3.0
EW15	GWES	1	ss	None	11/1/1996	319.07	321.47	10367.79	2681.24	18.8	13.1	18.1	12.1	3.0
EW16	GWES	1	ss	None	10/30/1997	319.07	321.49	10367.11	2660.87	20.0	14.3	19.3	13.3	3.0
EW17	GWES	1	SS	None	7/10/2012	319.50	319.50	9270.29	9896.06	15.0	4.0	14.0	14.5	0.5
EW18	GWES	1	SS	None	7/9/2012	319.25	319.25	9272.49	9939.25	15.0	4.0	14.0	14.5	0.5
F101S	Fac Pond 1&2	1	SS	Bailer	7/16/1986	320.42	322.63	8130.06	8739.83	24.0	7.6	23.0	17.4	4.0
F102D	Fac Pond 1&2	3	SS	Well Wiz	7/15/1986	318.96	320.02	8483.79	8569.43	40.7	30.2	35.8	11.0	1.7
F102S	Fac Pond 1&2	1	SS	Bailer	7/15/1986	319.26	320.55	8476.67	8568.92	20.0	8.6	19.5	13.4	4.0
F103S	Fac Pond 1&2	1	SS	Bailer	7/16/1986	316.84	319.06	9017.06	8718.12	18.0	7.7	18.3	12.3	3.7
F301S	Fac Pond3	1	SS	Bailer	7/14/1986	320.17	321.49	8115.55	10813.33	20.0	8.6	19.2	13.4	4.0
F302D	Fac Pond3	3	SS	Well Wiz	7/3/1986	319.48	321.30	9059.62	10805.35	50.0	31.1	49.3	20.5	4.5
F302S	Fac Pond3	1	SS	Bailer	6/27/1986	319.15	320.00	9058.00	10798.57	22.0	8.7	21.6	16.1	3.9
F501D	Fac Pond5	3	PVC	Well Wiz	11/30/2009	315.16	317.39	10929.99	10176.09	46.0	32.1	45.1	15.3	3.2
F501S	Fac Pond5	1	PVC	Bailer	11/24/2009	315.06	317.21	10929.41	10181.17	15.0	9.5	14.5	7.4	3.1
F502S	Fac Pond5	1	PVC	Bailer	11/3/2009	313.88	315.47	10135.26	10174.10	14.0	10.5	13.5	5.4	3.2
F5801D	TANK 58	3	SS	Well Wiz	7/11/1986	317.97	319.83	9343.04	9116.12	43.0	28.0	40.9	17.0	4.0
F5801S	TANK 58	1	SS	Bailer	7/2/1986	317.48	319.74	9342.70	9112.55	18.0	6.6	17.2	12.0	4.0
F5802S	TANK 58	1	SS	1" Bailer	7/15/1986	317.50	318.97	9215.98	9085.75	20.0	8.4	19.0	13.5	4.0
F801S	Fac Pond8	1	SS	Bailer	7/10/1986	319.22	321.89	8980.78	11208.39	18.0	7.2	17.8	12.3	4.2
F802LD	Fac Pond8	3	SS	Well Wiz	6/27/1986	321.57	323.65	9326.91	11520.16	55.3	40.8	53.7	15.4	4.7
F802S	Fac Pond8	1	SS	Bailer	6/19/1986	321.65	323.38	9327.53	11524.77	18.0	8.2	18.8	12.5	4.0
F802UD	Fac Pond8	3	SS	Well Wiz	7/1/1986	321.61	323.91	9325.22	11518.13	44.0	30.6	43.5	16.0	4.0
FP01D	Fire Pond	3	SS	Well Wiz	7/9/1986	318.44	320.87	9052.15	10066.45	52.0	32.5	50.7	21.0	4.0
FP01S	Fire Pond	1	SS	Bailer	6/30/1986	318.60	320.09	9052.37	10061.85	18.0	7.6	15.5	11.0	4.0
GDA01S	Investigation	1	PVC	Bailer	5/23/2001	318.00	320.37	9700.85	10077.82	20.0	7.8	18.0	10.2	3.0
GZR01S	SLF 11	1	SS	Bailer	9/26/1989	316.00	318.52	10815.26	11096.16	20.0	7.0	19.7	14.0	3.0
GZR02S	SLF 11	1	SS	Bailer	9/28/1989	316.00	318.65	11035.50	11481.38	18.0	7.4	17.8	11.5	3.0
GZR03S	SLF 11	1	SS	Bailer	9/29/1989	316.00	318.51	11030.44	11272.17	23.4	7.4	23.1	17.0	3.1
GZR04S	SLF 11	1	SS	Bailer	10/3/1989	318.00	319.67	11040.60	11754.05	18.3	7.2	17.6	11.9	3.1
LD91	GWES	1	PVC	Bailer		0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
LD92	GWES	1	PVC	Bailer		0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0

Table 3
Well Construction Summary

Well ID	Monitoring Unit	Zone (5)	Casing Material	Sampler Type (6)	Date Installed	Ground Elevation (1) (ft/msl)	Installed Elevation (2) (ft/msl)	Northing	Easting	Borehole Depth (3) (ft)	Top of Screen (4) (ft)	Bottom of Screen (4) (ft)	Sand Length (ft)	Seal Length
LMS01D	LAGOONS	3	PVC	Well Wiz	11/25/1997	321.26	323.76	9824.59	9729.43	45.9	33.0	43.0	12.5	3.9
LMS01S	LAGOONS	1	PVC	Bailer	11/20/1997	321.25	323.25	9824.22	9733.97	20.0	8.5	18.5	10.5	3.2
LMS02D	LAGOONS	3	PVC	Well Wiz	12/10/1997	316.52	319.02	9885.12	9414.68	42.0	35.0	40.3	8.5	3.9
LMS02S	LAGOONS	1	PVC	Well Wiz	12/8/1998	316.49	319.49	9884.59	9422.10	28.0	10.0	25.0	18.3	3.1
LMS03D	LAGOONS	3	PVC	Well Wiz	12/3/1998	314.19	316.69	9884.85	9056.64	40.0	33.0	38.0	8.8	3.2
LMS03S	LAGOONS	1	PVC	Bailer	12/1/1998	314.35	316.85	9884.43	9059.99	22.0	9.0	19.0	15.5	3.0
LMS04S	LAGOONS	1	PVC	Bailer	12/12/1997	319.17	321.67	9680.75	8776.92	20.0	8.5	18.5	12.5	3.5
P1001S	SLF 10	1	SS	Bailer	5/13/1986	321.19	322.44	8214.09	11442.85	18.0	6.5	17.9	12.4	4.2
P1002S	SLF 10	1	SS	Bailer	5/12/1986	322.16	323.64	8221.40	11645.47	22.0	8.4	19.0	12.7	4.3
P1102S	SLF 11	1	PVC	Bailer	12/13/1985	318.60	320.97	10159.59	11764.56	14.0	5.3	13.5	8.7	4.8
P1103S	SLF 11	1	SS	None	5/2/1986	318.36	320.54	10169.46	12151.62	22.0	5.8	21.7	16.7	4.3
P1104S	SLF 11	1	SS	None	5/5/1986	318.75	320.94	10171.52	12352.03	26.0	7.8	23.7	19.0	5.4
P1105S	SLF 11	1	SS	Bailer	5/1/1986	317.36	320.16	10772.02	12555.27	18.0	5.2	15.8	11.2	3.8
P1201S	SLF 12	1	SS	Bailer	8/14/1986	312.10	313.46	10131.98	8988.83	14.0	6.4	11.8	7.5	4.0
P1202S	GWES	1	SS	Well Wiz	8/14/1986	315.30	317.54	10534.15	9932.35	19.0	7.6	18.0	13.0	4.0
P1203S	GWES	1	PVC	None	8/16/1994	315.85	318.58	10501.12	9934.05	16.1	5.5	15.5	12.1	1.0
P1204S	GWES	1	PVC	None	10/17/1994	316.27	318.57	10541.50	9932.50	15.0	9.5	14.5	6.5	3.0
P1205S	GWES	1	PVC	None	10/18/1994	315.96	318.50	10549.50	9932.00	15.0	9.5	14.5	6.5	3.0
P1206S	GWES	1	PVC	None	10/17/1994	316.26	318.89	10558.50	9932.00	15.0	9.5	14.5	6.5	3.0
P701S	SLF 7	1	PVC	1"Well Wiz	12/20/1985	317.41	320.28	10523.20	11108.59	26.0	7.8	24.0	18.0	7.0
P702S	SLF 7	1	SS	Bailer	5/8/1986	315.98	317.50	10292.46	10859.51	20.0	8.5	19.1	11.5	4.6
P703S	SLF 7	1	SS	Bailer	9/18/1986	318.71	320.82	10308.39	11116.29	24.0	7.8	23.6	16.6	4.0
PA	GWES	1	SS	None	11/21/1990	316.10	318.61	9442.37	8671.16	21.5	16.6	21.4	17.4	1.0
PAN01	GWES	1	SS	None	11/26/1990	316.20	318.65	9444.72	8671.32	20.8	14.9	19.7	7.5	3.0
PAN02	GWES	1	SS	None	11/26/1990	316.10	318.71	9447.35	8670.99	20.1	12.7	20.1	7.4	3.1
PAN03	GWES	1	SS	None	11/27/1990	316.30	318.84	9451.78	8671.28	20.3	15.4	20.2	7.2	3.3
PAN04	GWES	1	SS	None	11/27/1990	316.00	319.20	9467.39	8671.10	20.8	14.8	19.6	8.1	2.9
PAS01	GWES	1	SS	None	11/1/1990	316.10	318.64	9440.38	8671.17	20.1	14.8	19.6	6.7	3.0
PAS02	GWES	1	SS	None	11/2/1990	316.10	318.67	9437.66	8671.10	20.1	14.8	19.6	8.0	3.0
PAS03	GWES	1	SS	None	11/2/1990	316.10	318.76	9432.32	8670.90	20.1	14.8	19.6	6.8	3.0
PAS04	GWES	1	SS	None	11/1/1990	316.00	319.19	9417.08	8671.45	20.5	14.2	19.0	7.4	3.0
PB	GWES	1	SS	None	11/21/1990	315.90	318.42	9442.51	8745.29	20.6	15.8	20.6	16.2	1.0

Table 3
Well Construction Summary

Well ID	Monitoring Unit	Zone (5)	Casing Material	Sampler Type (6)	Date Installed	Ground Elevation (1) (ft/msl)	Installed Elevation (2) (ft/msl)	Northing	Easting	Borehole Depth (3) (ft)	Top of Screen (4) (ft)	Bottom of Screen (4) (ft)	Sand Length (ft)	Seal Length
PBN01	GWES	1	SS	None	11/27/1990	316.10	318.46	9545.61	8745.67	20.6	15.3	20.1	7.5	3.0
PBN02	GWES	1	SS	None	11/27/1990	316.10	318.53	9448.34	8746.14	20.6	15.3	20.1	7.5	3.0
PBN03	GWES	1	SS	None	11/28/1990	316.20	318.51	9452.58	8745.81	20.8	15.4	20.2	7.6	2.9
PBN04	GWES	1	SS	None	11/28/1990	316.30	318.77	9467.37	8746.43	20.9	15.5	20.3	7.3	3.2
PBS01	GWES	1	SS	None	10/31/1990	315.90	318.40	9439.15	8748.15	20.4	14.9	19.7	6.5	3.2
PBS02	GWES	1	SS	None	10/31/1990	316.00	319.45	9435.91	8745.17	20.5	14.7	19.5	6.6	3.0
PBS03	GWES	1	SS	None	10/31/1990	315.80	318.47	9432.30	8745.20	20.3	14.8	19.6	6.6	3.1
PBS04	GWES	1	SS	None	11/1/1990	315.30	318.95	9411.63	8745.40	20.3	14.1	18.9	6.9	3.0
PC	GWES	1	SS	None	10/8/1992	320.40	322.37	9471.64	9733.41	23.9	17.6	22.8	17.9	3.0
PCN01	GWES	1	SS	None	10/8/1992	320.70	322.17	9476.84	9733.54	24.0	18.1	23.3	8.2	3.1
PCN02	GWES	1	SS	None	10/8/1992	322.40	324.70	9481.59	9733.43	25.4	19.7	24.9	7.0	3.0
PCN03	GWES	1	SS	None	10/12/1992	322.50	325.21	9492.31	9733.49	25.0	19.3	24.5	7.5	3.0
PCS01	GWES	1	SS	None	10/13/1992	320.10	322.62	9465.90	9733.32	23.0	17.5	22.7	17.0	3.0
PCS02	GWES	1	SS	None	10/13/1992	320.10	322.64	9460.61	9733.17	23.2	17.5	22.7	7.3	3.0
PCS03	GWES	1	SS	None	10/12/1992	319.70	322.32	9451.01	9733.00	22.7	17.3	22.5	7.6	2.9
PDN01	GWES	1	SS	None	9/26/1994		323.81	9499.19	9601.56	18.0	7.5	11.5	7.5	3.0
PDN02	GWES	1	SS	None	9/27/1994	324.30	324.84	9511.40	9603.10	19.0	7.5	12.5	7.5	3.0
PDN03	GWES	1	SS	None	9/26/1994	326.10	326.30	9527.00	9603.00	22.0	7.5	12.5	7.5	3.0
PE01S	GWES	1	ss	None	10/25/1996	319.07	321.79	10368.13	2688.53	15.0	9.7	14.7	6.0	3.0
PE02S	GWES	1	ss	None	10/24/1996	319.07	321.59	10368.20	2696.11	15.0	9.7	14.7	6.0	3.1
PE03S	GWES	1	ss	None	10/24/1996	319.07	321.84	10368.47	2705.30	15.0	9.7	14.7	6.0	3.0
PEW701	GWES	1	SS	None	11/19/1990	319.30	321.47	8194.96	9354.28	16.5	11.2	16.0	7.5	3.0
PEW702	GWES	1	SS	None	11/19/1990	319.20	321.38	8192.52	9354.65	16.4	11.1	15.9	7.5	3.0
PEW703	GWES	1	SS	None	11/19/1990	318.90	321.05	8187.95	9355.70	16.1	10.8	15.6	7.5	3.0
PEW704	GWES	1	SS	None	11/20/1990	318.40	320.95	8172.45	9358.18	15.6	10.3	15.1	7.5	3.0
PF	GWES	1	PVC	None	8/21/2012	320.37	320.37	9477.42	10138.94	10.2	4.3	9.3	6.1	2.0
PFN01	GWES	1	PVC	None	8/21/2012	319.65	319.65	9487.21	10137.71	10.0	4.5	9.5	6.0	2.0
PFN02	GWES	1	PVC	None	8/21/2012	319.39	319.39	9497.72	10136.29	10.0	4.2	9.2	6.0	2.0
PFS01	GWES	1	PVC	None	8/21/2012	320.80	320.84	9467.20	10140.82	11.0	5.0	10.0	6.0	2.5
PFS02	GWES	1	PVC	None	8/21/2012	320.90	320.88	9457.72	10141.80	11.0	5.0	10.0	6.0	2.5
PLM101	GWES	1	PVC	None	11/20/1997	321.49	323.99	9808.58	9731.50	22.0	14.0	19.0	9.8	3.2
PLM201	GWES	1	PVC	None	12/5/1997	317.85	320.35	9869.98	9420.43	16.0	9.5	14.5	7.4	3.1

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Well Construction Summary

Well ID	Monitoring Unit	Zone (5)	Casing Material	Sampler Type (6)	Date Installed	Ground Elevation (1) (ft/msl)	Installed Elevation (2) (ft/msl)	Northing	Easting	Borehole Depth (3) (ft)	Top of Screen (4) (ft)	Bottom of Screen (4) (ft)	Sand Length (ft)	Seal Length
PLM202	GWES	1	PVC	None	12/4/1997	317.75	320.25	9859.18	9418.89	15.0	9.2	14.2	11.5	1.0
PLM301	GWES	1	PVC	None	11/26/1997	315.23	317.73	9868.54	9058.20	18.0	10.5	15.5	3.3	7.5
R101D	RMU-1	3	SS	Well Wiz	2/21/1992	320.00	321.98	9970.83	11231.91	44.0	36.5	41.8	8.0	3.0
R101S	RMU-1	1	SS	Bailer	2/15/1992	319.90	321.65	9975.70	11232.64	18.0	8.0	15.3	10.0	3.1
R102D	RMU-1	3	SS	Well Wiz	2/20/1992	318.90	319.69	10093.55	11325.56	40.9	36.0	40.3	6.9	3.0
R102S	RMU-1	1	SS	Bailer	2/15/1992	318.90	320.66	10094.60	11331.65	16.0	8.1	13.4	7.8	3.3
R102SR	RMU-1	1	SS	Well Wiz	12/11/1992	331.20	333.89	10052.59	11333.53	24.0	12.0	22.3	12.7	3.3
R103D	RMU-1	3	SS	Well Wiz	2/20/1992	318.30	319.50	10101.83	11466.22	44.5	38.2	43.5	9.1	2.8
R103S	RMU-1	1	SS	Bailer	2/15/1992	318.40	321.25	10102.71	11471.69	16.0	7.5	12.8	8.3	3.1
R104D	RMU-1	3	SS	Well Wiz	2/22/1992	317.20	320.50	10105.73	11605.55	46.5	33.5	45.8	15.1	3.2
R104S	RMU-1	1	SS	Bailer	2/14/1992	317.40	320.37	10104.99	11610.61	18.0	8.0	13.3	8.0	3.1
R105D	RMU-1	3	SS	Well Wiz	2/22/1992	317.10	320.27	10107.46	11745.62	42.0	35.7	41.0	8.3	3.3
R105S	RMU-1	1	SS	Bailer	2/14/1992	317.00	320.82	10107.83	11705.85	16.0	7.9	13.2	7.7	3.1
R106D	RMU-1	3	SS	Well Wiz	2/24/1992	318.30	321.79	10111.01	11885.74	41.5	36.5	40.8	7.4	3.6
R106S	RMU-1	1	SS	Bailer	2/14/1992	317.80	320.83	10111.62	11891.10	20.0	7.6	18.0	12.9	3.0
R107D	RMU-1	3	SS	Well Wiz	2/26/1992	318.20	320.50	10114.93	12025.44	40.3	33.8	39.1	9.3	3.4
R107S	RMU-1	1	SS	Bailer	2/14/1992	318.00	320.71	10115.13	12031.02	26.0	8.6	23.9	18.8	4.0
R108D	RMU-1	3	SS	Well Wiz	2/25/1992	318.60	321.66	10117.85	12165.87	40.4	32.1	39.4	10.3	3.1
R108S	RMU-1	1	SS	1" Bailer	2/13/1992	318.60	321.77	10118.09	12171.29	20.0	8.2	18.5	12.9	3.1
R109D	RMU-1	3	SS	Well Wiz	2/26/1992	317.90	320.88	10121.42	12304.96	43.4	30.6	42.6	16.0	3.3
R109S	RMU-1	1	SS	Bailer	2/13/1992	317.40	321.18	10121.23	12311.52	22.0	8.0	17.3	12.3	3.0
R110D	RMU-1	3	SS	Well Wiz	3/1/1992	318.30	321.35	10122.44	12445.46	40.5	29.8	40.1	12.3	3.8
R110S	RMU-1	1	SS	Bailer	2/13/1992	318.40	322.16	10122.25	12451.54	24.0	9.1	21.4	15.1	3.2
R111D	RMU-1	3	SS	Well Wiz	2/27/1992	319.00	321.95	10131.92	12581.46	44.5	30.0	44.3	16.8	3.0
R111S	RMU-1	1	SS	Bailer	2/12/1993	319.00	321.14	10131.93	12587.91	23.0	8.8	21.1	14.9	3.4
R112S	RMU-1	1	SS	Well Wiz	2/27/1992	335.90	337.61	8579.41	11823.12	34.0	16.5	30.4	18.0	3.4
R113S	RMU-1	1	SS	Well Wiz	3/4/1992	323.00	325.41	8580.08	11858.65	20.0	9.6	16.9	10.0	3.2
R114D	RMU-1	3	SS	Well Wiz	3/4/1992	322.60	324.91	8797.90	11857.83	45.2	32.2	42.5	13.8	3.1
R114S	RMU-1	1	SS	Well Wiz	3/24/1992	322.20	323.90	8802.70	11858.26	24.0	8.6	19.0	13.6	3.5
R115S	RMU-1	1	SS	Bailer	2/17/1992	333.00	335.71	8937.00	11821.15	30.0	15.1	25.4	13.5	3.5
R116D	RMU-1	3	SS	Well Wiz	3/2/1992	320.50	322.60	9207.12	11856.43	42.7	30.0	42.3	14.9	2.8
R116S	RMU-1	1	SS	Well Wiz	2/27/1992	320.50	322.24	9211.86	11856.51	18.0	10.2	15.5	8.3	3.0

Table 3
Well Construction Summary

Well ID	Monitoring Unit	Zone (5)	Casing Material	Sampler Type (6)	Date Installed	Ground Elevation (1) (ft/msl)	Installed Elevation (2) (ft/msl)	Northing	Easting	Borehole Depth (3) (ft)	Top of Screen (4) (ft)	Bottom of Screen (4) (ft)	Sand Length (ft)	Seal Length
R117LD	RMU-1	3	SS	Well Wiz	8/17/1994	320.50	323.09	9362.90	11363.99	54.5	42.2	54.2	15.0	2.0
R117UD	RMU-1	3	SS	Well Wiz	8/17/1994	320.19	322.99	9362.03	11358.18	43.5	30.2	42.2	15.6	2.9
R118D	RMU-1	3	SS	Well Wiz	8/31/1994	319.09	321.32	9609.49	11203.07	45.7	30.5	42.5	16.3	4.0
R118S	RMU-1	1	SS	Bailer	8/23/1994	318.91	321.81	9602.72	11202.93	22.0	8.0	20.3	15.0	3.0
R119D	RMU-1	3	SS	Well Wiz	6/19/1995	318.84	322.98	9354.40	11681.00	47.3	31.7	47.0	17.9	3.4
R120D	RMU-1	3	SS	Well Wiz	6/22/1995	324.00	323.50	8229.30	12001.00	45.9	38.7	44.0	9.2	3.5
R121D	RMU-1	3	SS	None	7/6/1995	319.90	322.11	8247.70	12143.90	45.7	40.0	45.0	7.4	3.2
R122D	RMU-1	3	SS	None	7/13/1995	320.00	322.97	8305.60	12282.60	43.3	40.5	42.5	3.6	3.2
R125D	RMU-1	3	PVC	Well Wiz	5/30/2003	321.70	0.00	10090.25	12710.80	44.0	33.2	43.2	15.5	3.5
R126D	RMU-1	3	PVC	Well Wiz	5/28/2003	321.80	0.00	9953.23	12723.38	48.0	26.7	46.7	24.0	2.5
R127D	RMU-1	3	PVC	Well Wiz	5/23/2003	322.40	0.00	9813.01	12747.01	49.0	27.2	47.2	24.0	3.0
R128D	RMU-1	3	PVC	Well Wiz	5/20/2003	321.80	0.00	9672.78	12748.88	44.0	27.2	42.2	19.0	3.0
R129D	RMU-1	3	PVC	Well Wiz	5/16/2003	321.20	0.00	9551.43	12737.87	46.0	28.7	43.7	19.8	3.0
R130D	RMU-1	3	PVC	Well Wiz	5/9/2003	321.30	0.00	9408.00	12741.38	42.0	25.7	40.7	19.5	5.0
R131D	RMU-1	3	PVC	Well Wiz	5/13/2003	321.20	0.00	9268.15	12742.09	42.0	26.2	41.2	18.0	3.0
R132D	RMU-1	3	PVC	Well Wiz	5/5/2003	321.50	0.00	9127.91	12746.81	44.0	27.2	42.2	19.0	3.5
R133D	RMU-1	3	PVC	Well Wiz	8/22/2003	321.20	0.00	8991.54	12748.29	42.2	31.0	41.0	13.5	2.7
R134D	RMU-1	3	PVC	Well Wiz	4/28/2003	321.30	0.00	8847.88	12751.91	43.0	31.9	41.9	13.2	2.8
R135D	RMU-1	3	PVC	Well Wiz	4/24/2003	322.00	0.00	8708.48	12751.24	42.0	39.2	41.2	5.0	3.0
R1N08S	RMU-1	1	SS	Well Wiz	1/22/1996	328.90	336.98	10095.24	12221.99	30.2	17.0	29.0	15.2	15.0
R1N10S	RMU-1	1	SS	Well Wiz	10/10/1997	330.09	331.29	10105.69	12431.24	24.2	11.3	23.3	15.0	9.5
R1P01S	RMU-1	1	SS	None	3/13/1992	321.00	323.78	9876.40	12725.26	20.0	8.2	17.5	11.8	3.0
R1P02S	RMU-1	1	SS	None	3/12/1992	324.20	322.63	9543.67	12739.56	18.0	9.7	15.0	8.3	3.0
R1P03S	RMU-1	1	SS	None	3/11/1992	320.10	322.04	9190.58	12746.93	18.0	10.7	16.0	8.3	3.4
R1P04S	RMU-1	1	SS	None	3/23/1992	320.60	321.76	8900.21	12750.82	24.0	8.7	19.0	13.3	3.0
R1P05S	RMU-1	1	SS	None	3/6/1992	319.80	321.30	8685.30	12751.92	16.0	8.7	14.0	8.0	3.0
R1P07S	RMU-1	1	SS	None	3/9/1992	320.50	322.60	8228.42	12009.33	20.0	8.7	17.0	11.3	3.0
R1P08S	RMU-1	1	SS	None	3/13/1992	320.90	323.13	8936.27	11858.08	22.0	8.7	19.0	13.3	3.0
R1P09S	RMU-1	1	SS	None	3/6/1992	321.20	322.77	9367.54	11721.52	18.0	9.7	15.0	8.3	3.0
R1P10S	RMU-1	1	SS	None	3/5/1992	320.70	321.31	9366.67	11445.90	24.0	9.2	19.5	12.8	3.7
R201D	RMU-2	3	PVC	Well Wiz	11/20/2007	319.97	322.54	9193.09	10037.77	38.5	33.0	38.0	6.9	5.4
R201DR	RMU-2	3	PVC	Well Wiz	11/23/2009	320.87	323.03	9138.16	10496.21	49.0	34.5	48.5	16.9	3.1

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Well Construction Summary

Well ID	Monitoring Unit	Zone (5)	Casing Material	Sampler Type (6)	Date Installed	Ground Elevation (1) (ft/msl)	Installed Elevation (2) (ft/msl)	Northing	Easting	Borehole Depth (3) (ft)	Top of Screen (4) (ft)	Bottom of Screen (4) (ft)	Sand Length (ft)	Seal Length
R201S	RMU-2	1	PVC	Bailer	11/21/2007	319.99	322.05	9187.99	10037.76	15.5	10.0	15.0	7.5	3.5
R201SR	RMU-2	1	PVC	Bailer	11/20/2009	320.88	323.08	9143.40	10495.80	14.0	8.4	13.4	8.1	3.3
R202D	RMU-2	3	PVC	Well Wiz	11/13/2007	319.04	321.27	9510.93	10043.54	35.5	30.0	37.0	9.0	4.5
R202S	GWES	1	PVC	Bailer	11/9/2007	319.02	320.61	9516.60	10042.96	12.0	8.5	11.5	5.5	3.0
R203D	RMU-2	3	PVC	Well Wiz	11/13/2007	317.90	320.21	9681.14	10117.69	38.5	28.0	38.0	11.8	3.2
R203S	RMU-2	1	PVC	Bailer	11/8/2007	317.69	320.17	9685.89	10118.33	11.5	8.0	11.0	5.0	3.0
R204D	RMU-2	3	PVC	Well Wiz	11/1/2007	316.72	318.65	9970.04	10142.03	36.0	25.5	35.5	11.5	4.5
R204S	RMU-2	1	PVC	Bailer	10/30/2007	316.70	319.15	9975.71	10142.02	12.0	8.5	11.5	5.0	3.0
R205D	RMU-2	3	PVC	Well Wiz	11/29/2007	315.18	317.45	10007.43	10277.58	36.0	27.5	35.5	13.0	3.8
R205S	RMU-2	1	PVC	Bailer	11/26/2007	315.10	317.79	10006.78	10282.18	15.5	11.0	15.0	7.8	4.3
R206D	RMU-2	3	PVC	Well Wiz	10/29/2007	314.30	316.34	10009.04	10415.48	347.0	29.2	34.2	7.2	4.1
R206S	RMU-2	1	PVC	Bailer	10/24/2007	314.23	316.45	10010.05	10420.47	11.0	7.5	10.5	5.0	2.5
R207D	RMU-2	3	PVC	Well Wiz	10/23/2007	316.57	319.02	10010.61	10555.61	39.0	33.5	38.5	7.0	2.5
R207S	RMU-2	1	PVC	Bailer	10/23/2007	316.75	319.05	10010.62	10559.90	10.0	7.5	9.5	4.0	2.5
R208D	RMU-2	3	PVC	Well Wiz	11/7/2007	316.75	319.00	10010.33	10693.89	385.0	28.0	38.0	12.4	3.2
R208S	RMU-2	1	PVC	Bailer	11/2/2007	316.60	318.89	10010.21	10699.72	10.0	7.5	9.5	4.0	2.5
R209D	RMU-2	3	PVC	Well Wiz	11/14/2007	319.18	321.65	10010.74	10840.45	40.4	36.0	40.0	6.0	3.6
R209S	RMU-2	1	PVC	Bailer	11/13/2007	319.36	321.66	10011.33	10845.02	15.5	10.0	15.0	8.5	3.0
R210D	RMU-2	3	PVC	Well Wiz	11/23/2007	320.32	322.19	10005.19	10974.70	44.5	34.0	44.0	12.0	3.0
R210S	RMU-2	1	PVC	Bailer	11/19/2007	320.27	322.68	10005.51	10980.54	18.5	8.0	18.0	12.0	3.0
R211D	RMU-2	3	PVC	Well Wiz	12/7/2007	319.70	321.73	10011.29	11118.99	43.0	34.1	421.1	9.6	1.7
R211S	RMU-2	1	PVC	1" Well Wiz	12/3/2007	319.74	321.90	10011.40	11123.68	15.5	9.0	14.0	6.9	3.1
R212LD	RMU-2	3	PVC	Well Wiz	11/9/2009	334.55	336.46	9395.61	11280.01	69.1	56.4	68.4	15.1	3.0
R212S	RMU-2	1	PVC	Well Wiz	11/4/2009	334.51	336.39	9395.77	11285.02	34.0	23.5	33.5	12.6	4.3
R212UD	RMU-2	3	PVC	Well Wiz	11/12/2009	334.58	336.36	9395.28	11275.59	56.0	45.3	55.3	13.1	3.0
R213D	RMU-2	3	PVC	Well Wiz	12/12/2007	333.55	333.88	9398.64	11400.57	65.0	47.5	64.5	19.0	3.0
R213S	RMU-2	1	PVC	Well Wiz	12/6/2007	333.45	333.68	9398.81	11405.60	28.5	18.0	28.0	12.0	3.0
R214D	RMU-2	3	PVC	Well Wiz	12/5/2007	332.95	333.16	9398.78	11540.89	49.5	42.0	49.0	9.0	3.0
R214S	RMU-2	1	PVC	Well Wiz	11/30/2007	332.95	333.31	9399.30	11545.68	28.0	17.5	27.5	12.0	3.0
R215D	RMU-2	3	PVC	Well Wiz	11/29/2007	332.17	332.54	9400.23	11679.53	62.5	45.0	62.0	19.0	3.0
R215S	RMU-2	1	PVC	Well Wiz	11/26/2007	332.03	332.56	9399.56	11684.95	28.0	17.0	27.0	12.0	3.0
R216D	RMU-2	3	PVC	Well Wiz	11/17/2009	321.74	323.71	8856.61	10487.27	52.0	36.5	51.5	17.9	3.0

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Well Construction Summary

Well ID	Monitoring Unit	Zone (5)	Casing Material	Sampler Type (6)	Date Installed	Ground Elevation (1) (ft/msl)	Installed Elevation (2) (ft/msl)	Northing	Easting	Borehole Depth (3) (ft)	Top of Screen (4) (ft)	Bottom of Screen (4) (ft)	Sand Length (ft)	Seal Length
R216S	RMU-2	1	PVC	Bailer	11/13/2009	321.88	323.58	8861.78	10486.59	18.0	9.5	17.5	10.9	3.0
R2P01S	RMU-2	1	PVC	None	11/18/2009	322.54	324.47	8503.05	10499.74	16.0	8.2	15.2	9.9	2.1
RR01S	Investigation	1	SS	Bailer	5/24/2001	320.00	322.15	9372.61	10535.58	14.0	7.8	13.0	5.2	3.0
TP04S	E/W SALTS	1	SS	Bailer	6/12/1986	320.26	321.53	9029.28	9668.65	22.0	8.7	21.6	16.0	4.0
TW01S	E/W SALTS	1	SS	Well Wiz	5/19/1986	318.84	320.21	8813.84	8999.13	18.0	8.6	16.5	10.0	4.0
TW02S	E/W SALTS	1	SS	Well Wiz	5/21/1986	327.55	329.31	8852.86	9822.52	28.0	8.3	26.5	20.0	4.0
TW03D	E/W SALTS	3	SS	Well Wiz	6/18/1986	319.54	321.97	9027.80	9361.75	39.2	36.5	39.1	4.2	3.9
TW03S	E/W SALTS	1	SS	Well Wiz	5/20/1986	319.30	321.65	9027.13	9357.17	24.0	7.8	23.7	18.0	4.0
TW11S	LAGOONS	1	SS	Well Wiz	7/9/1986	316.86	319.21	9606.15	9999.31	20.0	7.5	18.1	13.0	4.0
TW12S	N SALTS	1	SS	Bailer	6/25/1986	311.86	314.54	10021.55	9310.83	16.3	5.2	15.8	11.3	4.0
TW13S	N SALTS	1	SS	Bailer	7/9/1986	318.34	319.96	9903.50	9620.12	22.0	8.3	21.2	16.0	4.0
TW14S	N SALTS	1	SS	Bailer	6/25/1986	312.53	314.74	10023.85	9875.18	16.0	7.8	15.7	10.0	4.0
TW15D	N SALTS	3	SS	Well Wiz	6/30/1986	313.77	315.43	10171.75	9558.56	37.0	34.2	36.8	5.0	4.0
TW15S	N SALTS	1	SS	Well Wiz	6/16/1986	313.78	316.06	10171.02	9553.97	24.0	7.6	23.5	17.5	4.0
TW16S	WDA	1	SS	Well Wiz	9/19/1986	317.66	319.88	9330.76	8627.92	24.0	12.6	23.0	17.0	4.0
TW17S	WDA	1	SS	Well Wiz	9/19/1986	315.33	317.66	9404.24	8759.03	20.0	7.6	18.0	13.0	4.0
TW18S	WDA	1	SS	Well Wiz	9/22/1986	316.43	318.72	9398.74	8895.99	18.0	7.6	18.0	12.0	4.0
TW19S	WDA	1	PVC	Well Wiz	6/1/1988	316.43	319.02	9527.21	8506.20	25.0	7.2	23.4	19.0	4.0
TW20S	WDA	1	PVC	Bailer	6/2/1988	315.70	318.28	9803.32	8651.41	20.0	8.2	18.9	14.0	4.5
TW21S	Investigation	1	PVC	Bailer	9/27/1988	320.50	323.52	7815.79	11194.72	18.0	6.8	17.5	12.8	3.0
TW24S	Investigation	1	PVC	Well Wiz	10/3/1988	321.00	323.42	8411.00	11158.50	16.0	7.6	15.8	10.0	3.0
TW25S	GWES	1	PVC	Well Wiz	10/4/1988	313.90	316.01	10489.97	9954.05	32.0	8.1	31.5	26.0	3.0
TW26S	Investigation	1	PVC	Well Wiz	10/5/1988	313.40	316.01	10770.81	9951.59	34.3	7.4	34.0	28.1	3.0
TW27S	GWES	1	PVC	Bailer	9/29/1988	320.00	323.18	7787.07	11213.01	18.0	7.4	17.8	11.8	3.2
TW29S	Investigation	1	PVC	Bailer	10/6/1988	319.10	321.54	8331.40	11203.63	16.0	7.6	15.8	10.1	3.0
TW30D	LAGOONS	3	PVC	Well Wiz	10/19/1988	320.40	322.02	9780.97	9797.13	50.0	41.1	49.2	9.2	3.8
W1001D	SLF 10	3	SS	Well Wiz	6/16/1986	319.24	321.21	8584.11	11213.51	36.9	33.9	36.5	4.9	4.2
W1001S	SLF 10	1	SS	Bailer	6/20/1986	319.05	321.70	8579.71	11212.55	24.0	7.2	23.4	18.5	4.0
W1002S	SLF 10	1	SS	Well Wiz	6/20/1986	320.72	322.88	8411.21	11217.38	22.0	7.7	20.9	16.0	5.0
W1003D	SLF 10	3	PVC	Well Wiz	12/13/2007	336.45	336.45	8688.60	11443.01	50.5	42.0	50.0	10.1	1.9
W1003S	SLF 10	1	PVC	Well Wiz	12/10/2007	334.61	336.68	8689.08	11447.21	25.0	19.5	24.5	7.0	3.0
W1004D	SLF 10	3	PVC	Well Wiz	12/20/2007	334.88	336.73	8697.56	11616.92	50.4	44.9	49.9	7.0	3.1

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Well ID	Monitoring Unit	Zone (5)	Casing Material	Sampler Type (6)	Date Installed	Ground Elevation (1) (ft/msl)	Installed Elevation (2) (ft/msl)	Northing	Easting	Borehole Depth (3) (ft)	Top of Screen (4) (ft)	Bottom of Screen (4) (ft)	Sand Length (ft)	Seal Length
W1004S	SLF 10	1	PVC	Well Wiz	12/18/2007	334.95	336.53	8698.03	11621.84	27.7	17.1	27.1	12.0	3.2
W101D	SLF 1-6	3	SS	Well Wiz	5/30/1986	319.53	322.63	8282.15	9017.19	48.1	36.9	47.5	14.0	4.3
W101S	SLF 1-6	1	SS	Bailer	5/14/1986	319.50	321.27	8277.05	9017.18	16.0	6.2	14.1	9.6	4.5
W102S	SLF 1-6	1	SS	Bailer	5/15/1986	320.26	321.63	8138.87	9168.11	24.0	6.5	22.4	17.8	4.7
W1101D	SLF 11	3	PVC	Well Wiz	11/18/1985	318.38	318.94	10692.45	11134.49	42.3	35.3	41.0	8.5	4.0
W1101S	SLF 11	1	PVC	Bailer	11/19/1985	317.09	319.11	10695.49	11134.37	25.0	7.8	24.0	18.0	5.0
W1102D	SLF 11	3	PVC	Well Wiz	12/17/1985	316.78	318.66	10834.02	11130.44	41.0	34.0	40.7	8.2	3.0
W1102S	SLF 11	1	PVC	Bailer	12/18/1985	317.77	319.37	10837.54	11130.27	24.0	11.2	22.0	16.0	7.0
W1103D	SLF 11	3	PVC	Well Wiz	11/13/1985	318.52	319.82	10956.65	11312.03	40.2	34.7	40.0	7.0	3.5
W1103S	SLF 11	1	PVC	Well Wiz	11/13/1985	316.01	318.97	10956.29	11306.25	28.0	9.8	26.0	19.0	7.0
W1104D	SLF 11	3	PVC	Well Wiz	12/12/1985	316.03	318.76	10956.84	11455.82	44.5	35.3	43.5	12.0	3.5
W1104S	SLF 11	1	PVC	Well Wiz	12/12/1985	316.40	320.37	10956.54	11452.00	22.0	11.0	21.8	12.0	10.0
W1105D	SLF 11	3	PVC	Well Wiz	12/4/1985	317.69	319.98	10966.60	11673.83	48.5	33.8	47.0	8.5	4.0
W1105S	SLF 11	1	PVC	Well Wiz	12/4/1985	317.32	319.08	10965.88	11670.05	18.0	7.8	16.0	10.3	7.0
W1106D	SLF 11	3	PVC	Well Wiz	11/8/1985	316.81	318.40	10968.66	11815.63	46.0	34.2	40.0	8.1	2.9
W1106S	SLF 11	1	PVC	Well Wiz	11/8/1985	317.63	320.04	10969.18	11818.98	26.0	7.3	23.5	18.5	5.5
W1107D	SLF 11	3	SS	Well Wiz	5/15/1986	317.16	318.66	10970.80	12020.11	44.5	38.4	43.3	7.6	4.4
W1107S	SLF 11	1	SS	Bailer	5/6/1986	317.33	319.78	10969.05	12028.70	18.5	5.5	18.4	13.5	3.0
W1108D	SLF 11	3	SS	Well Wiz	5/16/1986	317.43	318.93	10975.20	12164.61	43.5	38.2	41.0	6.6	5.5
W1108S	SLF 11	1	SS	Bailer	5/16/1986	317.02	319.18	10974.77	12168.46	24.1	7.8	23.7	17.1	6.0
W1109D	SLF 11	3	SS	Well Wiz	5/21/1986	317.16	318.92	10979.39	12304.16	44.0	38.2	43.8	7.8	4.2
W1109S	SLF 11	1	SS	Bailer	4/29/1986	316.77	319.47	10978.99	12309.01	18.0	7.4	17.9	12.0	5.0
W1201S	SLF 12	1	SS	Bailer	8/15/1986	314.40	315.83	10650.14	8595.35	16.0	6.1	13.9	10.0	4.0
W1202S	SLF 12	1	SS	Bailer	8/15/1986	314.50	315.82	10794.68	8592.08	17.0	6.5	14.3	10.0	3.5
W1203S	SLF 12	1	SS	Bailer	8/12/1986	313.70	315.01	10894.03	8692.77	24.0	6.5	22.3	17.6	4.6
W1204D	SLF 12	3	SS	Well Wiz	8/28/1986	313.80	317.48	10898.58	8875.05	54.0	40.1	52.9	15.0	4.1
W1204S	SLF 12	1	SS	Bailer	8/13/1986	314.60	316.38	10898.93	8880.33	26.0	8.1	23.9	18.2	4.2
W1205D	SLF 12	3	SS	Well Wiz	9/10/1986	314.30	315.88	10898.78	9074.06	58.3	43.3	56.1	16.0	4.0
W1205S	SLF 12	1	SS	Bailer	8/14/1986	314.60	315.91	10899.09	9077.48	16.5	7.6	15.4	9.7	4.0
W1206D	SLF 12	3	SS	Well Wiz	9/17/1986	314.00	316.08	10903.30	9265.13	54.6	37.8	53.6	17.1	4.0
W1206S	SLF 12	1	SS	Bailer	9/10/1986	314.30	315.53	10903.30	9269.68	22.0	8.6	19.0	14.0	4.0
W1207D	SLF 12	3	SS	Well Wiz	9/10/1986	313.80	315.42	10908.28	9451.28	52.5	45.9	51.6	7.5	4.0

Table 3
Well Construction Summary

Well ID	Monitoring Unit	Zone (5)	Casing Material	Sampler Type (6)	Date Installed	Ground Elevation (1) (ft/msl)	Installed Elevation (2) (ft/msl)	Northing	Easting	Borehole Depth (3) (ft)	Top of Screen (4) (ft)	Bottom of Screen (4) (ft)	Sand Length (ft)	Seal Length
W1207S	SLF 12	1	SS	Bailer	8/15/1986	313.50	315.10	10908.46	9455.38	22.0	8.4	18.8	13.4	4.0
W1208S	SLF 12	1	SS	Bailer	8/15/1986	312.90	314.66	10910.76	9648.43	20.0	5.8	18.9	14.9	3.1
W1209S	Investigation	1	PVC	Bailer	5/23/2001	314.00	316.11	10996.78	9952.36	14.0	7.8	12.9	6.8	3.0
W121LD	SLF 12	3	SS	Well Wiz	8/26/1986	314.40	316.11	10654.92	8595.11	57.0	43.1	55.9	15.1	4.9
W121UD	SLF 12	3	SS	Well Wiz	8/28/1986	314.10	316.19	10659.91	8595.43	45.0	36.1	43.9	9.6	4.1
W122LD	SLF 12	3	SS	Well Wiz	8/20/1986	314.70	315.89	10790.15	8592.61	63.5	49.6	62.4	15.0	4.5
W122UD	SLF 12	3	SS	Well Wiz	8/25/1986	314.70	315.47	10785.79	8592.48	50.8	39.0	49.4	11.5	4.1
W123LD	SLF 12	3	SS	Well Wiz	9/3/1986	314.10	316.50	10893.19	8686.93	64.2	50.4	63.2	15.2	4.2
W123UD	SLF 12	3	SS	Well Wiz	9/4/1986	314.10	316.97	10892.29	8682.94	50.5	37.1	50.2	14.4	3.8
W128LD	SLF 12	3	SS	Well Wiz	9/4/1986	312.80	315.28	10909.81	9643.78	48.6	45.4	47.8	3.3	4.5
W128UD	SLF 12	3	SS	Well Wiz	9/8/1986	313.20	314.36	10910.38	9639.59	44.0	33.7	41.5	10.0	4.0
W201D	SLF 1-6	3	SS	Well Wiz	6/12/1986	320.45	322.94	8475.58	9008.43	46.9	35.5	46.1	12.9	4.0
W201S	SLF 1-6	1	SS	Bailer	5/14/1986	320.78	322.75	8470.82	9009.52	20.0	8.0	18.6	12.1	4.0
W202LD	SLF 1-6	3	SS	Well Wiz	6/4/1986	334.21	335.40	8656.56	9176.53	63.2	51.4	62.0	13.0	4.0
W202S	SLF 1-6	1	SS	Well Wiz	5/27/1986	333.69	335.43	8655.93	9170.75	28.0	8.2	26.4	21.0	4.0
W202UD	SLF 1-6	3	SS	Well Wiz	6/6/1986	334.30	335.05	8657.54	9182.87	50.3	42.2	50.1	9.5	4.8
W301D	SLF 1-6	3	SS	Well Wiz	6/24/1986	334.61	336.68	8666.06	9371.06	64.5	47.8	63.7	18.0	4.0
W301S	SLF 1-6	1	SS	Well Wiz	6/13/1986	334.46	335.87	8666.49	9374.90	30.0	11.4	29.7	23.7	4.0
W302S	SLF 1-6	1	SS	Well Wiz	5/15/1986	319.52	320.92	8221.25	9374.06	18.0	8.6	16.5	10.0	4.0
W303S	SLF 1-6	1	SS	Bailer	9/13/1989	319.52	320.76	8137.15	9375.30	18.0	7.2	17.6	19.1	3.1
W401D	SLF 1-6	3	SS	Well Wiz	6/17/1986	333.58	334.86	8676.94	9653.13	66.6	48.6	64.5	20.0	4.0
W401S	SLF 1-6	1	SS	Well Wiz	6/11/1986	333.10	326.21	8676.62	9648.56	30.0	8.8	29.7	24.2	4.0
W402S	SLF 1-6	1	SS	Bailer	5/28/1996	319.94	321.60	8123.96	9664.84	22.0	6.9	17.5	12.7	4.0
W501D	SLF 1-6	3	SS	Well Wiz	5/20/1986	324.78	326.80	8740.29	9952.51	54.6	37.9	54.1	18.6	5.0
W501S	SLF 1-6	1	SS	Well Wiz	6/6/1986	325.24	327.65	8739.48	9958.07	24.0	7.5	23.4	17.9	4.0
W502S	SLF 1-6	1	SS	Bailer	5/16/1986	319.80	322.60	8115.91	9931.97	16.0	7.1	15.0	9.5	4.0
W601D	SLF 1-6	3	SS	Well Wiz	6/19/1986	322.74	325.76	8731.40	10223.77	43.0	36.9	42.5	7.5	4.0
W601S	SLF 1-6	1	SS	Bailer	6/2/1986	322.46	324.27	8732.63	10219.65	24.0	8.1	21.0	14.5	4.5
W602S	SLF 1-6	1	SS	Bailer	5/19/1986	321.88	324.16	8421.61	10448.86	24.0	7.6	23.5	17.6	4.4
W603S	SLF 1-6	1	SS	Bailer	6/4/1986	323.09	325.29	8130.51	10236.07	24.1	7.7	23.6	18.1	4.0
W701D	SLF 7	3	SS	Well Wiz	5/31/1986	313.91	316.11	10677.26	10381.04	38.5	27.8	38.1	12.4	4.1
W701S	SLF 7	1	SS	Bailer	5/8/1986	313.83	316.22	10672.90	10381.26	16.0	7.5	15.4	9.6	4.7

Table 3
Well Construction Summary

Well ID	Monitoring Unit	Zone (5)	Casing Material	Sampler Type (6)	Date Installed	Ground Elevation (1) (ft/msl)	Installed Elevation (2) (ft/msl)	Northing	Easting	Borehole Depth (3) (ft)	Top of Screen (4) (ft)	Bottom of Screen (4) (ft)	Sand Length (ft)	Seal Length
W702D	SLF 7	3	SS	Well Wiz	6/11/1986	314.55	317.23	10817.70	10378.65	39.5	33.2	38.8	8.0	4.5
W702S	SLF 7	1	SS	Bailer	5/9/1986	313.52	316.39	10813.38	10375.52	22.0	7.0	19.9	14.5	4.0
W703D	SLF 7	3	SS	Well Wiz	6/9/1986	315.24	316.60	10984.23	10487.19	42.5	39.5	42.1	5.4	4.0
W703S	SLF 7	1	SS	1"Well Wiz	5/8/1986	315.46	317.26	10984.19	10493.98	20.0	8.1	18.7	13.0	5.5
W704D	SLF 7	3	SS	Well Wiz	5/29/1986	315.41	317.67	10986.04	10629.00	44.0	40.8	43.4	4.8	4.1
W704S	SLF 7	1	SS	Bailer	5/7/1986	315.67	317.74	10986.34	10633.88	20.0	7.8	18.4	13.5	3.4
W705D	SLF 7	3	SS	Well Wiz	5/27/1986	316.42	318.21	10987.71	10772.87	40.0	29.1	39.7	14.1	3.9
W705S	SLF 7	1	SS	Bailer	5/6/1986	316.21	318.13	10987.77	10776.33	26.0	8.0	23.9	17.0	6.2
WDA01D	WDA	3	SS	Well Wiz	9/12/1991	316.20	318.58	9511.68	8746.39	40.6	29.4	40.1	12.7	6.8
WDA01S	WDA	1	PVC	Bailer	12/11/1997	316.19	318.69	9503.56	8748.69	28.0	10.2	25.2	17.3	2.9
WS01S	E/W SALTS	1	SS	Bailer	9/14/1989	320.00	319.91	9033.92	9117.13	20.0	8.6	19.0	13.0	3.3

Notes:

(1) Ground elevation at time of installation before concrete pad.

(2) Groundwater elevation is measured to the top of well casing

(3) Ground surface to bottom of boring

(4) Below ground surface

(5) Zone 1 -Upper Glacial Till; Zone 3- Glaciolacustrine Silt/Sand

(6) Well Wiz- Dedicated Well Wizard sampling bladder pump; Bailer- Dedicated stainless steel bailer

(7) Well Designations: S- Saturated zone (Shallow), D- Detection zone (Deep), UD- Upper detection zone, LD- Lower detection zone

(8) Elevation Vertical Site Datum

TABLE 6
ACTIVE MONITORING WELLS

Revised December 18, 2013

WELL ID	IS THE WELL IN ACCEPTABLE CONDITION? (Y OR N)		COMMENTS
BACKGROUND WELLS			
BW01S	☐ Y	☐ N	
BW01D	☐ Y	☐ N	
BW02D	☐ Y	☐ N	
BW03S	☐ Y	☐ N	
BW03D	☐ Y	☐ N	
BW04S	☐ Y	☐ N	
BW04D	☐ Y	☐ N	
BW05S	☐ Y	☐ N	
BW05D	☐ Y	☐ N	
SLF 1-6 WELLS			
W101S	☐ Y	☐ N	
W101D	☐ Y	☐ N	
W102S	☐ Y	☐ N	
W201S	☐ Y	☐ N	
W201D	☐ Y	☐ N	
W202S	☐ Y	☐ N	
W202UD	☐ Y	☐ N	
W202LD	☐ Y	☐ N	
W301S	☐ Y	☐ N	
W301D	☐ Y	☐ N	
W302S	☐ Y	☐ N	
W303S	☐ Y	☐ N	
W401S	☐ Y	☐ N	
W401D	☐ Y	☐ N	
W402S	☐ Y	☐ N	
W501S	☐ Y	☐ N	
W501D	☐ Y	☐ N	
W502S	☐ Y	☐ N	

TABLE 6
ACTIVE MONITORING WELLS

Revised December 18, 2013

WELL ID	IS THE WELL IN ACCEPTABLE CONDITION? (Y OR N)		COMMENTS
SLF 1-6 WELLS			
W601S	☐ Y	☐ N	
W601D	☐ Y	☐ N	
W602S	☐ Y	☐ N	
W603S	☐ Y	☐ N	
SLF 7 WELLS & PIEZOMETERS			
P701S	☐ Y	☐ N	
P702S	☐ Y	☐ N	
P703S	☐ Y	☐ N	
W701S	☐ Y	☐ N	
W701D	☐ Y	☐ N	
W702S	☐ Y	☐ N	
W702D	☐ Y	☐ N	
W703S	☐ Y	☐ N	
W703D	☐ Y	☐ N	
W704S	☐ Y	☐ N	
W704D	☐ Y	☐ N	
W705S	☐ Y	☐ N	
W705D	☐ Y	☐ N	
SLF 10 WELLS & PIEZOMETERS			
P1001S	☐ Y	☐ N	
P1002S	☐ Y	☐ N	
W1001S	☐ Y	☐ N	
W1001D	☐ Y	☐ N	
W1002S	☐ Y	☐ N	
W1003S	☐ Y	☐ N	
W1003D	☐ Y	☐ N	
W1004S	☐ Y	☐ N	
W1004D	☐ Y	☐ N	

TABLE 6
ACTIVE MONITORING WELLS

WELL ID	IS THE WELL IN ACCEPTABLE CONDITION? (Y OR N)	COMMENTS
SLF 11 WELLS & PIEZOMETERS		
P1102S	☐ Y ☐ N	
P1103S	☐ Y ☐ N	
P1104S	☐ Y ☐ N	
P1105S	☐ Y ☐ N	
W1101S	☐ Y ☐ N	
W1101D	☐ Y ☐ N	
W1102S	☐ Y ☐ N	
W1102D	☐ Y ☐ N	
W1103S	☐ Y ☐ N	
W1103D	☐ Y ☐ N	
W1104S	☐ Y ☐ N	
W1104D	☐ Y ☐ N	
W1105S	☐ Y ☐ N	
W1105D	☐ Y ☐ N	
W1106S	☐ Y ☐ N	
W1106D	☐ Y ☐ N	
W1107S	☐ Y ☐ N	
W1107D	☐ Y ☐ N	
W1108S	☐ Y ☐ N	
W1108D	☐ Y ☐ N	
W1109S	☐ Y ☐ N	
W1109D	☐ Y ☐ N	
GZR01S	☐ Y ☐ N	
GZR02S	☐ Y ☐ N	
GZR03S	☐ Y ☐ N	
GZR04S	☐ Y ☐ N	

Revised December 18, 2013

TABLE 6
ACTIVE MONITORING WELLS

WELL ID	IS THE WELL IN ACCEPTABLE CONDITION? (Y OR N)	COMMENTS
SLF 12 WELLS & PIEZOMETERS		
P1201S	☐ Y ☐ N	
W1201S	☐ Y ☐ N	
W121UD	☑ Y ☐ N	
W121LD	☐ Y ☐ N	
W1202S	☐ Y ☐ N	
W122UD	☐ Y ☐ N	
W122LD	☐ Y ☐ N	
W1203S	☐ Y ☐ N	
W123UD	☐ Y ☐ N	
W123LD	☐ Y ☐ N	
W1204S	☐ Y ☐ N	
W1204D	☐ Y ☐ N	
W1205S	☐ Y ☐ N	
W1205D	☐ Y ☐ N	
W1206S	☐ Y ☐ N	
W1206D	☐ Y ☐ N	
W1207S	☐ Y ☐ N	
W1207D	☐ Y ☐ N	
W1208S	☐ Y ☐ N	
W128UD	☐ Y ☐ N	
W128LD	☐ Y ☐ N	
FAC POND 1 & 2 WELLS		
F101S	☐ Y ☐ N	
F102S	☐ Y ☐ N	
F102D	☐ Y ☐ N	
F103S	☐ Y ☐ N	
FAC POND 3 WELLS		
F301S	☐ Y ☐ N	
F302S	☐ Y ☐ N	
F302D	☐ Y ☐ N	

TABLE 6
ACTIVE MONITORING WELLS

WELL ID	IS THE WELL IN ACCEPTABLE CONDITION? (Y OR N)	COMMENTS
FAC POND 5 WELLS		
F501S	☐ Y ☐ N	
F501D	☐ Y ☐ N	
F502S	☐ Y ☐ N	
FAC POND 8 WELLS		
F801S	☐ Y ☐ N	
F802S	☐ Y ☐ N	
F802LD	☐ Y ☐ N	
F802UD	☐ Y ☐ N	
TANK 58 WELLS		
F5801S	☐ Y ☐ N	
F5801D	☐ Y ☐ N	
F5802S	☐ Y ☐ N	
EAST\WEST SALTS AREA WELLS		
TW01S	☐ Y ☐ N	
TW02S	☐ Y ☐ N	
TW03S	☐ Y ☐ N	
TW03D	☐ Y ☐ N	
TP04S	☐ Y ☐ N	
WS01S	☐ Y ☐ N	
LAGOONS & GROUNDWATER INTERCEPTOR TRENCH WELLS		
LMS01S	☐ Y ☐ N	
LMS01D	☐ Y ☐ N	
LMS02S	☐ Y ☐ N	
LMS02D	☐ Y ☐ N	
LMS03S	☐ Y ☐ N	
LMS03D	☐ Y ☐ N	
LMS04S	☐ Y ☐ N	
TW11S	☐ Y ☐ N	
TW30D		
W202S	☐ Y ☐ N	

TABLE 6
ACTIVE MONITORING WELLS

WELL ID	IS THE WELL IN ACCEPTABLE CONDITION? (Y OR N)		COMMENTS
NORTH SALTS AREA WELLS			
TW12S	☐ Y	☐ N	
TW13S	☐ Y	☐ N	
TW14S	☐ Y	☐ N	
TW15S	☐ Y	☐ N	
TW15D	☐ Y	☐ N	
WEST DRUM AREA WELLS			
TW16S	☐ Y	☐ N	
TW17S	☐ Y	☐ N	
TW19S	☐ Y	☐ N	
TW20S	☐ Y	☐ N	
WDA01S	☐ Y	☐ N	
WDA01D	☐ Y	☐ N	
MISCELLANEOUS INVESTIGATION AREA WELLS			
GDA01S	☐ Y	☐ N	
RR01S	☐ Y	☐ N	
W1209S	☐ Y	☐ N	
TW21S	☐ Y	☐ N	
TW24S	☐ Y	☐ N	
TW26S	☐ Y	☐ N	
TW29S	☐ Y	☐ N	
RMU-1 WELLS & PIEZOMETERS			
R1P01S	☐ Y	☐ N	
R1P02S	☐ Y	☐ N	
R1P03S	☐ Y	☐ N	
R1P04S	☐ Y	☐ N	
R1P05S	☐ Y	☐ N	
R1P07S	☐ Y	☐ N	
R1P08S	☐ Y	☐ N	
R1P09S	☐ Y	☐ N	
R1P10S	☐ Y	☐ N	

TABLE 6
ACTIVE MONITORING WELLS

WELL ID	IS THE WELL IN ACCEPTABLE CONDITION? (Y OR N)		COMMENTS
RMU-1 WELLS & PIEZOMETERS			
R101S	☐ Y	☐ N	
R101D	☐ Y	☐ N	
R102S	☐ Y	☐ N	
R102SR	☐ Y	☐ N	
R102D	☐ Y	☐ N	
R103S	☐ Y	☐ N	
R103D	☐ Y	☐ N	
R104S	☐ Y	☐ N	
R104D	☐ Y	☐ N	
R105S	☐ Y	☐ N	
R105D	☐ Y	☐ N	
R106S	☐ Y	☐ N	
R106D	☐ Y	☐ N	
R107S	☐ Y	☐ N	
R107D	☐ Y	☐ N	
R108S	☐ Y	☐ N	
R1N08S	☐ Y	☐ N	
R108D	☐ Y	☐ N	
R109S	☐ Y	☐ N	
R109D	☐ Y	☐ N	
R110S	☐ Y	☐ N	
R1N10S	☐ Y	☐ N	
R110D	☐ Y	☐ N	
R111S	☐ Y	☐ N	
R111D	☐ Y	☐ N	
R112S	☐ Y	☐ N	
R113S	☐ Y	☐ N	
R114S	☐ Y	☐ N	
R114D	☐ Y	☐ N	
R115S	☐ Y	☐ N	
R116S	☐ Y	☐ N	
R116D	☐ Y	☐ N	

TABLE 6
ACTIVE MONITORING WELLS

WELL ID	IS THE WELL IN ACCEPTABLE CONDITION? (Y OR N)		COMMENTS
RMU-1 WELLS & PIEZOMETERS (continued)			
R117UD	☐ Y	☐ N	
R117LD	☐ Y	☐ N	
R118S	☐ Y	☐ N	
R118D	☐ Y	☐ N	
R119D	☐ Y	☐ N	
R120D	☐ Y	☐ N	
R121D	☐ Y	☐ N	
R122D	☐ Y	☐ N	
R125D	☐ Y	☐ N	
R126D	☐ Y	☐ N	
R127D	☐ Y	☐ N	
R128D	☐ Y	☐ N	
R129D	☐ Y	☐ N	
R130D	☐ Y	☐ N	
R131D	☐ Y	☐ N	
R132D	☐ Y	☐ N	
R133D	☐ Y	☐ N	
R134D	☐ Y	☐ N	
R135D	☐ Y	☐ N	

GWSAP

Appendix D

(replace entire table)

GROUNDWATER WELL ID CHARTS

(Last updated 12/18/13)

Well ID	Well Elevation	Well Depth	Status	Purpose	Sampler Type
			BACKGROUND WELLS		
B34A	321.89	42.90	CLEAN	CONTROL	None
BW01D	321.08	40.32	CLEAN	Detection Well	Well Wiz
BW01S	321.53	15.93	CLEAN	Detection Well	Bailer
BW02D	322.57	42.87	CLEAN	Detection Well	Well Wiz
BW03D	320.84	49.89	CLEAN	Detection Well	Well Wiz
BW03S	322.75	13.57	CLEAN	Detection Well	Bailer
BW04D	323.53	40.65	CLEAN	Detection Well	Well Wiz
BW04S	323.84	17.93	CLEAN	Detection Well	Bailer
BW05S	321.13	17.88	CLEAN	Detection Well	Bailer
BW05D	321.65	42.49	CLEAN	Detection Well	Well Wiz
			FAC POND 1 & 2 WELLS		
F101S	322.62	25.36	CLEAN	Detection Well	Bailer
F102D	320.06	32.42	CLEAN	Detection Well	Well Wiz
F102S	320.55	20.95	CLEAN	Detection Well	Bailer
F103S	319.05	20.51	CLEAN	Detection Well	Bailer
			FAC POND 3 WELLS		
F301S	321.51	20.55	CLEAN	Detection Well	Bailer
F302D	321.26	50.26	CLEAN	Detection Well	Well Wiz
F302S	320.41	22.94	CLEAN	Detection Well	Bailer
			FAC POND 5 WELLS		
F501D	317.31	48.89	CLEAN	Detection Well	Well Wiz
F501S	317.11	16.99	CLEAN	Detection Well	Bailer
F502S	315.41	18.04	CLEAN	Detection Well	Bailer
			FAC POND 8 WELLS		
F801S	321.83	20.56	CLEAN	Detection Well	Bailer
F802LD	323.63	55.73	CLEAN	Detection Well	Well Wiz
F802S	323.44	20.56	CLEAN	Detection Well	Bailer
F802UD	323.97	45.69	CLEAN	Detection Well	Well Wiz

GROUNDWATER WELL ID CHARTS

(Last updated 12/18/13)

Well ID	Well Elevation	Well Depth	Status	Purpose	Sampler Type
			TANK 58 WELLS		
F5801D	319.84	40.25	CLEAN	Detection Well	Well Wiz
F5801S	319.84	19.54	CLEAN	Detection Well	Bailer
F5802S	319.35	20.58	CLEAN	Detection Well	1" Bailer
			FIRE POND WELLS		
FP01D	320.94	52.35	CLEAN	Detection Well	Well Wiz
FP01S	320.83	17.92	CLEAN	Detection Well	Bailer
			EAST/WEST SALTS AREA WELLS		
TP04S	321.75	22.92	CLEAN	Detection Well	Bailer
TW01S	320.20	17.92	**DIRTY**	Detection Well	Well Wiz
TW02S	329.46	28.27	CLEAN	Detection Well	Well Wiz
TW03D	322.08	41.56	CLEAN	Detection Well	Well Wiz
TW03S	321.82	25.93	CLEAN	Detection Well	Well Wiz
WS01S	320.02	20.51	CLEAN	Detection Well	Bailer
			NORTH SALTS AREA WELLS		
TW12S	314.49	18.56	CLEAN	Detection Well	Bailer
TW13S	319.92	22.94	CLEAN	Detection Well	Bailer
TW14S	314.69	17.92	CLEAN	Detection Well	Bailer
TW15D	315.38	38.52	CLEAN	Detection Well	Well Wiz
TW15S	316.06	25.92	CLEAN	Detection Well	Well Wiz
			INVESTIGATION WELLS		
TW21S	323.54	20.73	CLEAN	Detection Well	Bailer
TW24S	323.49	18.20	**DIRTY**	Detection Well	Well Wiz
TW26S	318.25	38.96	**DIRTY**	Detection Well	Well Wiz
TW29S	321.55	18.23	CLEAN	Detection Well	Bailer
RR01S	322.11	15.12	CLEAN	Detection Well	Bailer
W1209S	316.06	15.23	CLEAN	Detection Well	Bailer
GDA01S	320.32	20.14	CLEAN	Detection Well	Bailer

GROUNDWATER WELL ID CHARTS

(Last updated 12/18/13)

Well ID	Well Elevation	Well Depth	Status	Purpose	Sampler Type
			LAGOONS WELLS		
LMS01D	324.00	45.87	CLEAN	Detection Well	Well Wiz
LMS01S	323.45	20.48	CLEAN	Detection Well	Bailer
LMS02D	319.31	43.02	CLEAN	Detection Well	Well Wiz
LMS02S	319.77	28.12	CLEAN	Detection Well	Well Wiz
LMS03D	316.96	40.98	CLEAN	Detection Well	Well Wiz
LMS03S	317.20	21.71	CLEAN	Detection Well	Bailer
LMS04S	321.83	21.48	CLEAN	Detection Well	Bailer
TW11S	319.24	20.58	**DIRTY**	Detection Well	Well Wiz
TW30D	322.05	51.25	CLEAN	Detection Well	Well Wiz
			WEST DRUM AREA WELLS		
WDA01D	318.55	42.56	CLEAN	Detection Well	Well Wiz
WDA01S	318.97	27.86	CLEAN	Detection Well	Bailer
TW16S	319.82	25.56	**DIRTY**	Detection Well	Well Wiz
TW17S	317.65	20.57	**DIRTY**	Detection Well	Well Wiz
TW18S	318.73	20.56	**DIRTY**	Detection Well	Well Wiz
TW19S	318.89	26.20	**DIRTY**	Detection Well	Well Wiz
TW20S	318.26	20.73	CLEAN	Detection Well	Bailer
			GROUNDWATER EXTRACTION SYSTEM WELLS		
AQ01	319.97	22.61	**DIRTY**	Aqueous Sump	
AQ02	319.54	21.46	**DIRTY**	Aqueous Sump	Well Wiz
AQ03	318.38	20.96	**DIRTY**	Aqueous Sump	None
AQ04	318.43	20.81	**DIRTY**	Aqueous Sump	None
AQ05	318.62	19.06	**DIRTY**	Aqueous Sump	Well Wiz
AQ06	319.76	21.84	**DIRTY**	Aqueous Sump	None
AQ07	319.26	21.16	**DIRTY**	Aqueous Sump	Well Wiz
AQ08	323.61	23.86	**DIRTY**	Aqueous Sump	None
AQ09	322.96	29.00	**DIRTY**	Aqueous Sump	Well Wiz
AQ10	321.28	29.61	**DIRTY**	Aqueous Sump	None
AQ11	323.53	18.36	**DIRTY**	Aqueous Sump	None

GROUNDWATER WELL ID CHARTS

(Last updated 12/18/13)

Well ID	Well Elevation	Well Depth	Status	Purpose	Sampler Type
GROUNDWATER EXTRACTION SYSTEM WELLS (continued)					
AQ12	323.35	18.31	**DIRTY**	Aqueous Sump	Well Wiz
AQ13W	321.24	24.62	**DIRTY**	Aqueous Sump	Well Wiz
AQ14E	321.33	25.49	**DIRTY**	Aqueous Sump	Well Wiz
AQ15	323.95	15.25	**DIRTY**	Aqueous Sump	Well Wiz
BW02S	322.12	15.90	**DIRTY**	Extraction Well	Well Wiz
TW27S	323.00	20.75	**DIRTY**	Extraction Well	Bailer
BWP01S	322.82	17.40	**DIRTY**	Performance Piezometer	None
BWP02S	323.07	17.59	**DIRTY**	Performance Piezometer	None
BWP03S	322.96	16.90	**DIRTY**	Performance Piezometer	None
BWP04S	323.30	17.03	**DIRTY**	Performance Piezometer	None
DS01	318.62	26.21	**DIRTY**	DNAPL Sump	None
DS02	318.74	25.71	**DIRTY**	DNAPL Sump	None
DS03	318.62	24.55	**DIRTY**	DNAPL Sump	None
DS04	319.17	25.42	**DIRTY**	DNAPL Sump	None
DS05	318.43	24.52	**DIRTY**	DNAPL Sump	None
DS06	319.18	24.50	**DIRTY**	DNAPL Sump	None
DS07	318.68	28.49	**DIRTY**	DNAPL Sump	None
DS08	320.67	26.31	**DIRTY**	DNAPL Sump	None
DS09	318.15	24.50	**DIRTY**	DNAPL Sump	None
DS10	317.44	22.60	**DIRTY**	DNAPL Sump	None
DS11	317.84	25.01	**DIRTY**	DNAPL Sump	None
DS12	317.03	22.01	**DIRTY**	DNAPL Sump	None
DS13	317.58	23.56	**DIRTY**	DNAPL Sump	None
DS14	317.20	23.86	**DIRTY**	DNAPL Sump	None
DS15	318.13	23.23	**DIRTY**	DNAPL Sump	None
DS16	318.18	23.61	**DIRTY**	DNAPL Sump	None
DS17	318.79	24.38	**DIRTY**	DNAPL Sump	None
DS18	318.87	24.54	**DIRTY**	DNAPL Sump	None
DS19	318.35	22.65	**DIRTY**	DNAPL Sump	None
DS20	323.20	27.11	**DIRTY**	DNAPL Sump	None
DS21	321.98	25.96	**DIRTY**	DNAPL Sump	None
DS22	321.53	30.16	**DIRTY**	DNAPL Sump	None

GROUNDWATER WELL ID CHARTS

(Last updated 12/18/13)

Well ID	Well Elevation	Well Depth	Status	Purpose	Sampler Type
GROUNDWATER EXTRACTION SYSTEM WELLS (continued)					
DS23	321.07	31.71	DIRTY	DNAPL Sump	None
DS26	323.47	20.79	DIRTY	DNAPL Sump	None
DS27	320.90	18.22	DIRTY	DNAPL Sump	None
DS28	322.32	23.56	DIRTY	DNAPL Sump	None
DS29	322.15	27.76	DIRTY	DNAPL Sump	None
EW06	321.66	18.53	DIRTY	Extraction Well	Well Wiz
EW07	321.77	19.48	DIRTY	Extraction Well	Well Wiz
EW08	323.71	19.01	DIRTY	Extraction Well	None
EW09	323.04	19.91	DIRTY	Extraction Well	None
EW10	322.82	21.97	DIRTY	Extraction Well	None
EW11	322.50	15.06	DIRTY	Extraction Well	None
EW12	322.14	17.91	DIRTY	Extraction Well	Well Wiz
EW13	321.97	21.56	DIRTY	Extraction Well	None
EW14	321.74	19.81	DIRTY	Extraction Well	None
EW15	321.46	21.97	DIRTY	Extraction Well	None
EW16	321.46	21.75	DIRTY	Extraction Well	None
EW17	321.94	17.90	DIRTY	Extraction Well	None
EW18	322.04	17.79	DIRTY	Extraction Well	None
LD91	324.50	0.00	DIRTY	Performance Piezometer	Bailer
LD92	321.61	0.00	DIRTY	Performance Piezometer	Bailer
P1201S	313.50	13.58	CLEAN	Piezometer	Bailer
P1202S	317.54	20.54	DIRTY	Extraction Well	Well Wiz
P1203S	318.62	18.08	DIRTY	Performance Piezometer	None
P1204S	318.52	17.00	DIRTY	Performance Piezometer	None
P1205S	318.46	17.16	DIRTY	Performance Piezometer	None
P1206S	318.85	17.20	DIRTY	Performance Piezometer	None
TW25S	316.32	33.73	DIRTY	Extraction Well	Well Wiz
PA	318.50	21.72	DIRTY	Performance Piezometer	None
PAN01	318.52	21.80	DIRTY	Performance Piezometer	None
PAN02	318.58	21.91	DIRTY	Performance Piezometer	None
PAN03	318.74	22.36	DIRTY	Performance Piezometer	None
PAN04	319.08	21.15	DIRTY	Performance Piezometer	None
PAS01	318.51	22.14	DIRTY	Performance Piezometer	None

GROUNDWATER WELL ID CHARTS

(Last updated 12/18/13)

Well ID	Well Elevation	Well Depth	Status	Purpose	Sampler Type
GROUNDWATER EXTRACTION SYSTEM WELLS (continued)					
PAS02	318.54	22.15	DIRTY	Performance Piezometer	None
PAS03	318.64	22.42	DIRTY	Performance Piezometer	None
PAS04	319.06	22.82	DIRTY	Performance Piezometer	None
PB	318.32	21.29	DIRTY	Performance Piezometer	None
PBN01	318.33	21.86	DIRTY	Performance Piezometer	None
PBN02	318.41	21.96	DIRTY	Performance Piezometer	None
PBN03	318.38	21.97	DIRTY	Performance Piezometer	None
PBN04	318.67	22.26	DIRTY	Performance Piezometer	None
PBS01	318.28	21.81	DIRTY	Performance Piezometer	None
PBS02	318.32	21.51	DIRTY	Performance Piezometer	None
PBS03	318.35	21.76	DIRTY	Performance Piezometer	None
PBS04	317.83	21.40	DIRTY	Performance Piezometer	None
PC	322.33	25.26	DIRTY	Performance Piezometer	None
PCN01	322.10	25.27	DIRTY	Performance Piezometer	None
PCN02	324.66	27.31	DIRTY	Performance Piezometer	None
PCN03	325.16	27.31	DIRTY	Performance Piezometer	None
PCS01	322.56	25.36	DIRTY	Performance Piezometer	None
PCS02	322.58	25.36	DIRTY	Performance Piezometer	None
PCS03	322.26	25.30	DIRTY	Performance Piezometer	None
PDN01	323.77	19.57	DIRTY	Performance Piezometer	None
PDN02	328.09	23.66	DIRTY	Performance Piezometer	None
PDN03	330.75	26.79	DIRTY	Performance Piezometer	None
PE01S	321.80	17.00	DIRTY	Performance Piezometer	None
PE02S	321.55	17.46	DIRTY	Performance Piezometer	None
PE03S	321.80	16.96	DIRTY	Performance Piezometer	None
PEW701	321.51	18.86	DIRTY	Performance Piezometer	None
PEW702	321.34	18.76	DIRTY	Performance Piezometer	None
PEW703	321.01	17.34	DIRTY	Performance Piezometer	None
PEW704	321.46	18.57	DIRTY	Performance Piezometer	None
PF	322.32	11.25	DIRTY	Performance Piezometer	None
PFN01	321.52	11.37	DIRTY	Performance Piezometer	None

GROUNDWATER WELL ID CHARTS

(Last updated 12/18/13)

Well ID	Well Elevation	Well Depth	Status	Purpose	Sampler Type
GROUNDWATER EXTRACTION SYSTEM WELLS (continued)					
PFN02	321.39	11.20	**DIRTY**	Performance Piezometer	None
PFS01	322.91	12.07	**DIRTY**	Performance Piezometer	None
PFS02	322.95	12.07	**DIRTY**	Performance Piezometer	None
PLM101	324.23	21.73	**DIRTY**	Performance Piezometer	None
PLM201	320.58	17.35	**DIRTY**	Performance Piezometer	None
PLM202	320.45	16.79	**DIRTY**	Performance Piezometer	None
PLM301	317.81	18.38	**DIRTY**	Performance Piezometer	None
SLF 1-6 WELLS					
W101D	322.60	50.37	CLEAN	Detection Well	Well Wiz
W101S	321.26	15.89	CLEAN	Detection Well	Bailer
W102S	321.61	23.67	CLEAN	Detection Well	Bailer
W201D	322.99	48.42	CLEAN	Detection Well	Well Wiz
W201S	322.84	20.56	CLEAN	Detection Well	Bailer
W202S	335.49	28.27	**DIRTY**	Detection Well	Well Wiz
W202UD	335.24	50.93	CLEAN	Detection Well	Well Wiz
W202LD	335.39	63.20	CLEAN	Detection Well	Well Wiz
W301D	336.69	65.74	CLEAN	Detection Well	Well Wiz
W301S	335.87	31.30	**DIRTY**	Detection Well	Well Wiz
W302S	320.87	17.92	**DIRTY**	Detection Well	Well Wiz
W303S	320.77	20.49	CLEAN	Detection Well	Bailer
W401D	334.91	65.51	CLEAN	Detection Well	Well Wiz
W401S	336.29	32.96	**DIRTY**	Detection Well	Well Wiz
W402S	320.87	18.58	CLEAN	Detection Well	Bailer
W501D	326.82	55.79	CLEAN	Detection Well	Well Wiz
W501S	327.68	25.21	CLEAN	Detection Well	Well Wiz
W502S	322.82	17.91	CLEAN	Detection Well	Bailer
W601D	325.76	45.33	CLEAN	Detection Well	Well Wiz
W601S	324.27	22.59	CLEAN	Detection Well	Bailer
W602S	324.16	25.94	CLEAN	Detection Well	Bailer
W603S	325.30	25.58	CLEAN	Detection Well	Bailer

GROUNDWATER WELL ID CHARTS

(Last updated 12/18/13)

Well ID	Well Elevation	Well Depth	Status	Purpose	Sampler Type
			SLF 7 WELLS		
W701S	316.24	17.92	CLEAN	Detection Well	Bailer
W701D	316.40	39.56	CLEAN	Detection Well	Well Wiz
W702S	316.39	22.94	CLEAN	Detection Well	Bailer
W702D	317.23	41.35	CLEAN	Detection Well	Well Wiz
W703S	317.31	20.44	**DIRTY**	Detection Well	1"Well Wiz
W703D	316.63	43.56	CLEAN	Detection Well	Well Wiz
W704S	317.82	20.58	CLEAN	Detection Well	Bailer
W704D	318.13	45.46	CLEAN	Detection Well	Well Wiz
W705S	318.18	25.94	CLEAN	Detection Well	Bailer
W705D	318.24	40.17	CLEAN	Detection Well	Well Wiz
P701S	320.27	27.59	**DIRTY**	Det/Inv	1"Well Wiz
P702S	317.41	20.50	CLEAN	Piezometer	Bailer
P703S	320.79	25.96	**DIRTY**	Det/Inv	Bailer
			SLF 10 WELLS		
W1001S	321.70	26.25	CLEAN	Detection Well	Bailer
W1001D	321.19	38.58	CLEAN	Detection Well	Well Wiz
W1002S	322.83	23.27	**DIRTY**	Detection Well	Well Wiz
W1003S	336.45	27.94	CLEAN	Detection Well	Well Wiz
W1003D	336.22	53.24	CLEAN	Detection Well	Well Wiz
W1004S	336.30	30.39	CLEAN	Detection Well	Well Wiz
W1004D	336.49	55.68	CLEAN	Detection Well	Well Wiz
P1001S	322.46	18.48	CLEAN	Piezometer	Bailer
P1002S	323.64	20.54	CLEAN	Piezometer	Bailer
			GZR WELLS		
GZR01S	318.58	22.12	CLEAN	Detection Well	Bailer
GZR02S	318.82	20.54	CLEAN	Detection Well	Bailer
GZR03S	318.55	25.84	CLEAN	Detection Well	Bailer
GZR04S	319.63	20.44	CLEAN	Detection Well	Bailer

GROUNDWATER WELL ID CHARTS

(Last updated 12/18/13)

Well ID	Well Elevation	Well Depth	Status	Purpose	Sampler Type
			SLF 11 WELLS		
W1101S	319.08	26.19	CLEAN	Detection Well	Bailer
W1101D	318.94	42.94	CLEAN	Detection Well	Well Wiz
W1102S	319.24	23.75	CLEAN	Detection Well	Bailer
W1102D	318.62	41.73	CLEAN	Detection Well	Well Wiz
W1103S	318.92	29.19	**DIRTY**	Detection Well	Well Wiz
W1103D	319.77	43.25	CLEAN	Detection Well	Well Wiz
W1104S	320.36	25.75	**DIRTY**	Detection Well	Well Wiz
W1104D	318.70	46.07	CLEAN	Detection Well	Well Wiz
W1105S	319.45	18.21	**DIRTY**	Detection Well	Well Wiz
W1105D	319.95	48.64	CLEAN	Detection Well	Well Wiz
W1106S	320.06	26.25	**DIRTY**	Detection Well	Well Wiz
W1106D	318.36	41.52	CLEAN	Detection Well	Well Wiz
W1107S	319.73	20.92	CLEAN	Detection Well	Bailer
W1107D	318.62	44.92	CLEAN	Detection Well	Well Wiz
W1108S	319.12	24.19	CLEAN	Detection Well	Bailer
W1108D	318.87	44.96	CLEAN	Detection Well	Well Wiz
W1109S	319.34	20.56	**DIRTY**	Detection Well	Bailer
W1109D	318.90	45.58	CLEAN	Detection Well	Well Wiz
P1102S	321.26	16.23	CLEAN	Piezometer	Bailer
P1103S	320.47	23.78	CLEAN	Piezometer	None
P1104S	320.90	25.70	CLEAN	Piezometer	None
P1105S	320.33	18.58	CLEAN	Piezometer	Bailer
			SLF 12 WELLS		
W1201S	315.80	15.98	CLEAN	Detection Well	Bailer
W121UD	316.29	45.27	CLEAN	Detection Well	Well Wiz
W121LD	316.06	57.85	CLEAN	Detection Well	Well Wiz
W1202S	315.78	15.98	CLEAN	Detection Well	Bailer
W122UD	315.42	50.50	CLEAN	Detection Well	Well Wiz
W122LD	315.85	63.71	CLEAN	Detection Well	Well Wiz
W1203S	315.04	23.93	CLEAN	Detection Well	Bailer
W123UD	316.85	53.21	CLEAN	Detection Well	Well Wiz

GROUNDWATER WELL ID CHARTS

(Last updated 12/18/13)

Well ID	Well Elevation	Well Depth	Status	Purpose	Sampler Type
			SLF 12 WELLS (continued)		
W123LD	316.63	66.06	CLEAN	Detection Well	Well Wiz
W1204S	316.40	25.97	CLEAN	Detection Well	Bailer
W1204D	317.46	55.60	CLEAN	Detection Well	Well Wiz
W1205S	315.90	16.89	CLEAN	Detection Well	Bailer
W1205D	315.88	57.54	CLEAN	Detection Well	Well Wiz
W1206S	315.54	20.68	CLEAN	Detection Well	Bailer
W1206D	316.11	55.30	CLEAN	Detection Well	Well Wiz
W1207S	315.10	20.63	**DIRTY**	Detection Well	Bailer
W1207D	315.39	53.52	CLEAN	Detection Well	Well Wiz
W1208S	314.63	20.98	CLEAN	Detection Well	Bailer
W128UD	317.43	45.92	CLEAN	Detection Well	Well Wiz
W128LD	315.28	50.54	CLEAN	Detection Well	Well Wiz
			RMU-1 WELLS		
R101D	322.06	44.31	CLEAN	Detection Well	Well Wiz
R101DR	0.00	0.00	0	Detection Well	0
R101S	321.71	17.25	CLEAN	Detection Well	Bailer
R101SR	0.00	0.00	0	Detection Well	0
R102D	319.73	42.37	CLEAN	Detection Well	Well Wiz
R103D	319.57	45.27	CLEAN	Detection Well	Well Wiz
R102S	320.67	16.23	CLEAN	Detection Well	Bailer
R102SR	333.72	36.50	CLEAN	Detection Well	Well Wiz
R103S	321.26	16.25	CLEAN	Detection Well	Bailer
R104D	320.61	48.21	CLEAN	Detection Well	Well Wiz
R104S	320.45	15.24	CLEAN	Detection Well	Bailer
R105D	320.32	43.35	CLEAN	Detection Well	Well Wiz
R105S	320.87	16.25	**DIRTY**	Detection Well	Bailer
R106D	321.81	44.29	CLEAN	Detection Well	Well Wiz
R106S	320.84	20.23	**DIRTY**	Detection Well	Bailer
R107D	320.63	41.29	CLEAN	Detection Well	Well Wiz
R107S	320.71	26.26	**DIRTY**	Detection Well	Bailer

GROUNDWATER WELL ID CHARTS

(Last updated 12/18/13)

Well ID	Well Elevation	Well Depth	Status	Purpose	Sampler Type
			RMU-1 WELLS (continued)		
R108D	321.64	42.31	CLEAN	Detection Well	Well Wiz
R108S	321.79	21.25	**DIRTY**	Detection Well	1" Bailer
R1N08S	336.94	37.70	CLEAN	Detection Well	Well Wiz
R109D	320.89	45.29	CLEAN	Detection Well	Well Wiz
R109S	320.19	19.25	CLEAN	Detection Well	Bailer
R110D	321.38	43.28	CLEAN	Detection Well	Well Wiz
R110S	322.22	25.24	**DIRTY**	Detection Well	Bailer
R1N10S	331.24	30.15	CLEAN	Detection Well	Well Wiz
R111D	322.00	47.27	CLEAN	Detection Well	Well Wiz
R111S	321.18	23.26	CLEAN	Detection Well	Bailer
R112S	337.62	32.33	CLEAN	Detection Well	Well Wiz
R113S	337.23	32.24	CLEAN	Detection Well	Well Wiz
R114D	336.02	56.52	CLEAN	Detection Well	Well Wiz
R114S	335.55	32.96	CLEAN	Detection Well	Well Wiz
R115S	335.75	28.26	CLEAN	Detection Well	Bailer
R116D	335.58	58.72	CLEAN	Detection Well	Well Wiz
R116S	334.29	30.32	CLEAN	Detection Well	Well Wiz
R117LD	323.12	57.29	CLEAN	Piezometer	Well Wiz
R117UD	322.93	45.27	CLEAN	Piezometer	Well Wiz
R118D	321.31	45.30	CLEAN	Detection Well	Well Wiz
R118S	321.78	23.23	CLEAN	Detection Well	Bailer
R119D	323.04	50.31	CLEAN	Piezometer	Well Wiz
R120D	323.69	47.46	CLEAN	Piezometer	Well Wiz
R121D	325.41	51.80	CLEAN	Piezometer	None
R122D	326.21	48.69	CLEAN	Piezometer	None
R125D	325.95	48.09	CLEAN	Detection Well	Well Wiz
R126D	325.03	50.05	CLEAN	Detection Well	Well Wiz
R127D	326.15	51.17	CLEAN	Detection Well	Well Wiz
R128D	326.81	47.40	CLEAN	Detection Well	Well Wiz
R129D	327.38	50.24	CLEAN	Detection Well	Well Wiz
R130D	325.54	45.69	CLEAN	Detection Well	Well Wiz

GROUNDWATER WELL ID CHARTS

(Last updated 12/18/13)

Well ID	Well Elevation	Well Depth	Status	Purpose	Sampler Type
			RMU-1 WELLS (continued)		
R131D	325.09	44.93	CLEAN	Detection Well	Well Wiz
R132D	325.11	46.54	CLEAN	Detection Well	Well Wiz
R133D	325.34	45.93	CLEAN	Detection Well	Well Wiz
R134D	324.44	45.46	CLEAN	Detection Well	Well Wiz
R135D	325.33	46.09	CLEAN	Detection Well	Well Wiz
R1P01S	323.90	20.19	CLEAN	Piezometer	None
R1P02S	327.25	21.52	CLEAN	Piezometer	None
R1P03S	322.24	18.21	CLEAN	Piezometer	None
R1P04S	324.43	23.70	CLEAN	Piezometer	None
R1P05S	324.29	18.80	CLEAN	Piezometer	None
R1P07S	322.77	19.19	CLEAN	Piezometer	None
R1P08S	335.23	31.52	CLEAN	Piezometer	None
R1P09S	322.92	18.19	CLEAN	Piezometer	None
R1P10S	321.36	21.21	CLEAN	Piezometer	None
			RMU-2 WELLS		
R201S	322.05	17.54	**DIRTY**	Detection Well	Bailer
R201D	322.54	41.29	CLEAN	Detection Well	Well Wiz
R201SR	323.08	16.76	CLEAN	Detection Well	Bailer
R201DR	323.03	51.26	CLEAN	Detection Well	Well Wiz
R202S	320.61	13.34	**DIRTY**	Detection Well	Bailer
R202D	321.27	39.99	CLEAN	Detection Well	Well Wiz
R203S	320.17	13.44	CLEAN	Detection Well	Bailer
R203D	320.21	40.34	CLEAN	Detection Well	Well Wiz
R204S	319.15	14.01	**DIRTY**	Detection Well	Bailer
R204D	318.65	37.97	CLEAN	Detection Well	Well Wiz
R205S	317.79	18.20	CLEAN	Detection Well	Bailer
R205D	317.45	38.34	CLEAN	Detection Well	Well Wiz
R206S	316.45	13.07	CLEAN	Detection Well	Bailer
R206D	316.34	36.94	CLEAN	Detection Well	Well Wiz
R207S	319.05	12.34	CLEAN	Detection Well	Bailer
R207D	319.02	41.74	CLEAN	Detection Well	Well Wiz

GROUNDWATER WELL ID CHARTS

(Last updated 12/18/13)

Well ID	Well Elevation	Well Depth	Status	Purpose	Sampler Type
			RMU-2 WELLS (continued)		
R208S	318.89	12.36	**DIRTY**	Detection Well	Bailer
R208D	319.00	40.49	CLEAN	Detection Well	Well Wiz
R209S	321.66	17.47	CLEAN	Detection Well	Bailer
R209D	321.65	43.45	CLEAN	Detection Well	Well Wiz
R210S	322.68	21.12	CLEAN	Detection Well	Bailer
R210D	322.19	46.28	CLEAN	Detection Well	Well Wiz
R211S	321.90	16.89	CLEAN	Detection Well	1" Well Wiz
R211D	321.73	44.76	CLEAN	Detection Well	Well Wiz
R212S	336.39	36.03	CLEAN	Detection Well	Well Wiz
R212UD	336.36	55.57	CLEAN	Detection Well	Well Wiz
R212LD	336.46	71.12	CLEAN	Detection Well	Well Wiz
R213S	333.68	28.49	CLEAN	Detection Well	Well Wiz
R213D	333.88	64.79	CLEAN	Detection Well	Well Wiz
R214S	333.31	28.19	CLEAN	Detection Well	Well Wiz
R214D	333.16	49.43	CLEAN	Detection Well	Well Wiz
R213S	333.68	28.49	CLEAN	Detection Well	Well Wiz
R215S	332.56	27.89	CLEAN	Detection Well	Well Wiz
R215D	332.54	61.86	CLEAN	Detection Well	Well Wiz
R216S	323.58	20.18	CLEAN	Detection Well	Bailer
R216D	323.71	54.94	CLEAN	Detection Well	Well Wiz
R2P01S	324.47	18.29	CLEAN	Piezometer	None

“RMU-2 ENGINEERING REPORT”

Submitted in separate electronic file

“RMU-2 SOIL EXCAVATION MONITORING AND MANAGEMENT PLAN AND RMU-2 CORRECTIVE ACTION PLAN"

RMU–2 PROJECT SPECIFIC SOIL EXCAVATION MONITORING AND MANAGEMENT PLAN

CWM CHEMICAL SERVICES, LLC.
MODEL CITY FACILITY

November 2009
Revised November 2013

Prepared By:	*CWM Chemical Services, LLC.* *1550 Balmer Road* *Model City New York, 14107*
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APPENDICES

I Introduction

CWM Chemical Services, LLC (CWM) owns and operates a commercial hazardous waste treatment, storage, and disposal facility (TSDF) located in Model City, Niagara County, New York. The Model City facility began operation in 1972 as ChemTrol Pollution Services, Inc. As a result of corporate acquisitions and name changes, CWM Chemical Services, LLC, a subsidiary of Waste Management, Inc., is the present owner and operator of the facility. The facility is located on Balmer Road in Model City, New York approximately 1.9 miles east of New York State Route 18 (Creek Road) and occupies land in the towns of Lewiston and Porter. All existing treatment, storage, and disposal facilities on the site are located within the Town of Porter.

Prior to being operated as a Treatment, Storage and Disposal Facility (TSDF), the property currently owned by CWM Chemical Services, LLC (CWM), was utilized by the U.S. Government from the early 1940s to the mid 1960s as part of the Lake Ontario Ordinance Works (LOOW). Some of these U.S. Government activities resulted in the contamination of certain areas of the Model City Facility with chemical and radioactive wastes. On April 27, 1972, the New York State Department of Health (NYSDOH) issued an order relating to approximately 614 acres of former LOOW property, which imposed certain restrictions on the use of said property. On June 21, 1974, NYSDOH issued a supplemental order to amend the 1972 order.

As a result of extensive corrective remedial actions taken at the CWM property since the 1972 Order, on May 7, 1992, the Department of Energy (DOE) certified that the majority of the CWM property was "in compliance with applicable (radiological) decontamination criteria and standards" and provided "assurance that future use of the property will result in no radiological exposure above DOE criteria and standards established to protect members of the general public or site occupants". Decontamination was certified for all properties owned by CWM, with the exception of three properties designated as E, E' and G. These properties were excluded from the decontamination certification because an area within each property could not be properly assessed due to inaccessibility and the DOE could not confirm that contamination did not exist in these areas. The three inaccessible areas were (1) soil beneath Lagoon 6 and the berm surrounding that lagoon on Property E, (2) soil beneath a roadway and PCB storage tanks on Property E', and (3) soil beneath the treated wastewater surface impoundment on the western edge of Property G. After reviewing all historical documentation and data related to the areas covered by the Orders, both in the NYSDOH files and files provided by CWM, the NYSDOH determined a potential for residual radiological contamination still exists and that monitoring is necessary prior to and during any excavation activities. In order to address this concern, the NYSDEC included permit condition J.3.b. in Module II (Corrective Action) of CWM's Sitewide Permit.

As required by Condition D.4.b of Exhibit B (Supplement to Module II - Corrective Action) of CWM's Sitewide 6 NYCRR Part 373 Permit, a Project Specific Soil Excavation Monitoring and Management Plan is required for all excavations/soil disturbances exceeding 1,000 square meters (m^2) or 150 cubic meters (m^3). Since CWM is in the process of planning the construction of a new hazardous waste landfill designated Residuals Management Unit No. 2 (RMU-2) at the site, along with a new treated wastewater surface impoundment (Fac Pond 5) and the relocation of several operations which are currently located within the RMU-2 footprint, which will involve the excavation of soils in volumes greater than the above thresholds, this Project Specific Plan is thus being prepared in anticipation of that construction project.

II RMU-2 Overview

CWM is proposing to construct and operate additional secure landfill disposal capacity to replace depleted existing hazardous and industrial non-hazardous waste disposal capacity at its site located at the Model City Facility. The proposed facility will be designated Residuals Management Unit 2 (RMU-2) and will be located within the property boundaries of the Model City Facility. The proposed facility is approximately 43.5 acres which will be divided into 6 operating cells. The approximate capacity of the landfill will be 4 million cubic yards. The landfill will be constructed with a double composite liner system (primary and secondary systems) with leachate collections systems for each cell. Other supporting operational units which need to be constructed includes a Facultative Pond for the storage of treated wastewaters, concrete secondary containment structures for the storage of waste containers, a new drum management facility, wetlands mitigation, and finally, a combined heavy equipment and facility maintenance building. All of these construction activities are considered to be part of the RMU-2 Project.

In many of the areas to be excavated as part of the RMU-2 project, a surface radiological survey has been performed as part of the Sitewide Radiological Survey Plan (Sitewide Survey). The only areas not surveyed are currently inaccessible (e.g., Fac Ponds containing water, highly vegetated or wooded areas). In addition, CWM has performed a subsurface investigation of the proposed footprint area of RMU-2, including those of the supporting operating units (Drum Management Building Fac Pond& 5). The subsurface investigation included both radiological and chemical screening of the soils up to the proposed excavation depths of each unit. Reports of both activities have been previously forwarded to the NYSDEC for review.

III Excavation Methods

In order to complete the construction of RMU-1 and the associated operating units, several types of excavation methods will be utilized. A brief description and examples of each excavation method is as follows:

Clearing and Grubbing: Removal of vegetation and trees within the proposed landfill footprint and associated operating units. This activity will utilize tree/stump grinders, bulldozers, excavators, haul trucks, and similar heavy equipment to scrape and/or cut down existing vegetation and trees. This excavation method typically only disturbs the soil within 6 inches of the surface, with the exception of tree stumps.

Mass Excavation: This method of excavation will be used for removing large quantities of soil at varying depths over a wide area. Examples of this type of excavation include removing soils to the baseliner subgrades of the landfill or facultative pond, and removing soils from existing soil stockpiles on-site. Bulldozers, excavators, haul trucks, and similar heavy equipment are typically used to complete this activity.

Deep Trenching: This method of excavation will be used for removing large quantities of soil at depths greater than 4 feet, but over a narrow width where accessibility to the trench walls and surfaces is not feasible. Examples of this type of excavation include the proposed slurry wall located at the interior bottom toe of slope within the landfill and the construction of the new leachate force main transfer line. Excavators, haul trucks, and similar heavy equipment are typically used to complete this activity.

Shallow Trenching: This method of excavation will be used for removing large quantities of soil at depths less than 4 feet, but over a narrow width where human occupancy within the trench is required. An example of this is the excavation of new building foundations or manhole installations. Bulldozers, excavators, haul trucks, and similar heavy equipment are typically used to complete this activity.

All soils excavated from the RMU-2 footprint and other associated construction activities will remain on-site and will be evaluated for future use in construction activities where necessary.

IV Radiological Detection

As part of the RMU-2 Project, several excavation methods and radiological scanning techniques will be utilized in order to meet the requirements of condition J.3.b of Module II (Corrective Action) of CWM's Sitewide 6 NYCRR Part 373 Permit. Due to the type of material excavated, configuration of the excavation, and accessibility within the excavation, scanning techniques and equipment will vary in order to scan the disturbed soils adequately. Note that these excavations methods will most likely exceed the threshold quantity of 150 cubic meters (m^3) which activates the requirement for a Project Specific Plan as per CWM's Permit.

A. Radiological Scanning for Clearing and Grubbing

Typically for clearing and grubbing activities, soil disturbance occurs from the removal of vegetation, brush, tree stumps, etc.. Initial scanning of the ground surface is difficult due to the presence of the vegetation and brush. The scanning equipment will become entangled and possibly damaged while trying to manually scan the surfaces. In addition, the Rad Tech is exposed to possible tripping hazards and injury while attempting to scan these areas. Historically, CWM has considered these areas to be inaccessible for manual scanning activities. Therefore, CWM is proposing to scan these areas utilizing the method outlined in Section III(A)(2) of this plan, ie., using the portal monitors. The vegetation, brush and tree stumps will be excavated and placed into haul trucks and driven through the portal monitors. Once the surface has been adequately cleared and deemed suitable for access, a manual walkover of the area will be completed as outlined in Section III(A)(1) of this plan.

B. Radiological Scanning for Mass Excavations

Generally, mass excavations include the removal of large quantities of soil over wide areas at varying depths. In addition, large heavy equipment is utilized to accomplish the excavation activities. Manually radiologically scanning every 6 inch lift of soil in a continuous fashion would be hazardous to the Rad Tech due to their proximity to the heavy equipment and the irregular surfaces on which they must walk. In addition, the heavy equipment utilized for mass excavations is not engineered for maintaining a 6 inch removal cut of soil. For mass excavations, CWM will initially complete a surface walkover of the area to be excavated before any soil disturbance activity occurs for all areas not previously scanned during the Sitewide Survey. Once this is completed and it has been verified that the surface does not contain any elevated radiological activity above the action level, mass excavation of the area may begin. The soil will be excavated and placed within the haul trucks and driven through the portal monitors for radiological scanning. Previous subsurface investigations support the use of this method. Upon completion of the mass excavation, a final manual walkover survey will be completed as long as surfaces are deemed to be safely accessible for scanning.

C. Radiological Scanning for Deep Trenches

The radiological scanning of deep trenches is difficult to accomplish due to the narrow configuration and the inability to access the trench thoroughly enough to complete the scanning of all surfaces while still obtaining reliable data. Scanning of a deep trench will be performed by first radiologically scanning the initial surface area of the trench footprint for all areas not previously scanned during the Sitewide Survey. Then the trench surfaces will be scanned at approximately every 6 inches up to a maximum depth of 4 feet. Below 4 feet, the excavated soil will be scanned only by the portal monitors. Minimizing the potential fall hazards to the Rad Tech and reducing cave in potential to all workers is a key concern for all parties. All soil excavated from the deep trench will be placed into haul trucks and driven through the portal monitors for radiological scanning. Upon completion of the deep trench excavation, a final radiological scan of the exposed excavation will not be completed.

D. Radiological Scanning of Shallow Trenches

The radiological scanning of shallow trenches will be performed by first radiologically scanning the initial surface area of the trench footprint for all areas not previously scanned during the Sitewide Survey. Then the trench surfaces will be scanned at approximately every 6 inches up to a maximum depth of 4 feet. All excavated soil from the shallow trench will be placed into haul trucks and driven through the portal monitors for additional radiological scanning. Upon completion of the shallow trench excavation, a final radiological scan of the exposed excavation will be completed.

E. Radiation Detection Equipment and Scanning Procedures

Two types of radiological scanning equipment and procedures are proposed for use for the RMU-2 Project.

1. Hand Held Manual Meter(s) – For manual hand scanning of soils, surveys will be accomplished using a 2-inch x 2-inch Sodium Iodide (NaI) gamma scintillation detector (e.g. Ludlum Model 44-10 Gamma Scintillator 47-1104) with a scaler/ratemeter (e.g. Ludlum Model 2221 portable SCA 48-2065), or equivalent. The approximate detection sensitivities will be 2120 pCi/g for Th-230, 2.8 pCi/g for

Ra-226 and 39 pCi/g for U-238, following the guidance of NUREG-1507 (U.S. Nuclear Regulatory Commission, 1998) using nominal literature values for background, response and site conditions for Ludlum detectors. All instrumentation will have current calibration (within the past 12 months or more frequently if recommended by the manufacturer). Daily field performance checks (i.e. background and source check) will be conducted in accordance with individual instrument use procedures. These performance checks will be performed prior to daily field activities and at any time the instrument response appears questionable. Only data obtained using instruments that satisfy the performance requirements will be accepted for use in the evaluation. Prior to radiological screening a background level will be established.

The surface area of the intended excavation (where accessible), or soil excavated, will be scanned by a qualified radiological technician (Rad Tech) using a 2-inch x 2-inch Sodium Iodide (NaI) gamma scintillation detector with a scaler/ratemeter. For surface surveys, the analyst will walk at a speed of approximately 2 feet per second while passing the detector within 6 inches of the ground surface in a serpentine fashion. For scanning of excavated soil piles or excavator buckets, the Rad Tech will hold the probe within 6 inches of the soil and move the probe across the surface of the soil. Audible output of the instrument will be monitored. At locations of increased activity, the reading on the meter will be reviewed and the value recorded. An initial investigation level of approximately 1.5 times background will be employed. Historically, a 16,000 counts per minute (cpm) investigation has been employed for screening of planar surfaces.

2. Haul Truck Survey Equipment – surveying of soils within haul trucks (dump trucks) will be accomplished using an ASM II-3000E (or equivalent) vehicle monitoring portal (see Appendix 1). Prior to radiological surveying of haul trucks a background level will be established. The portal detectors will be calibrated using Microshield (or equivalent) calculations to determine the appropriate alarm set point, so the portal alarms may be initially set at a count rate of 1.5 times background. If multiple types of haul vehicles are used (e.g. road-going dump trucks <u>and</u> articulating off-road dump haulers), the alarm set point will be calibrated to the most limiting vehicle geometry so that the same portal will be good for all potential vehicles used. Demonstration of the applicability of the method will be tested prior to field use. The portal monitor alarm set-point will be approximately equal to 1.5 times background (action level). The alarm set-point may need adjustment depending on false positive alarms and other potential issues. CWM will work closely with the NYSDEC Radiological Sites Section to establish the monitoring sets points and to resolve issues. The gross gamma count rate threshold is based on the detection of the following activity concentrations: 2120 pico-Curies per gram (pCi/g) of Thorium-230 (Th-230), 2.8 pCi/g of Radium-226 (Ra-226) and 39 pCi/g of Uranium-238 (U-238). The shielding and dose-rate program Microshield will be used to develop the portal monitor alarm set point adjusting for the depth of the truck bed.

All soils excavated from the construction area and not scanned in place by the hand method must be transported through a portal monitor. Typically, this would involve excavating the soil with a bulldozer or excavator, loading the soil into a dump truck, and transporting the soil in the truck through the portal monitor. Portal speed limits will be posted and must be observed. All vehicle operators transporting soil from the landfill footprint will be trained in the procedures used to pass through the portal. Signage will be erected to guide truck traffic in the proper direction. A Rad Tech will be positioned at the portals to observe and document the trucks passing through.

F. Elevated Radiological Detection Response Procedure

For manual scanning activities, if a reading greater than the investigation level is detected, the approximate area of increased activity will be delineated and the requirements of the attached Health & Safety Plan (HASP) will be followed (see Appendix 2). If an elevated reading is obtained, a one minute static count will be taken with the detector located no more than 2 inches above the ground surface. In addition, the on-site NYSDEC Site Monitor will be notified. If it appears that there is a localized spot of activity (<10 square foot), the soil may be excavated and placed in a container for further evaluation. Prior to excavation, specified Personal Protective Equipment (PPE) will be donned. Efforts will be made to minimize dusting and release during excavation (eg. soil may be wetted prior to removal). After soil exceeding the investigation value is removed, the exposed surface will be surveyed to ensure that the potentially impacted soil has been completely removed. Impacted soils will be containerized. If characterization is desired, the soil will be sampled, and the samples sent to an off-site laboratory for isotopic uranium, thorium, and gamma spectroscopy (including radium), analysis. CWM will coordinate split sampling as requested by the NYSDEC. All laboratory results will be submitted to the NYSDEC with the monthly Environmental Report for the month in which the sample was collected. If it is determined that the soil is a radioactive waste, it will be disposed of by CWM in accordance with all applicable laws and regulations, no later than two years after it has been excavated. CWM will also consult with the New York State Department of Health if a new specific radioactive materials license is required to authorize storage of the soil while arrangements are made for disposal. If the area appears to be >10 square foot, the excavation in that area will be suspended and the agencies consulted. If the excavation is suspended, prevention of air dispersion and run-on/run-off control will be priorities while the finding is discussed with the agencies. The excavation area may be covered with a tarp, or backfilled with soil while options are evaluated. Access to the area will be restricted until a decision is reached.

If the portal monitor alarms, indicating a load exceeds the action level (approximating the hand method threshold of 16,000 gross cpm), the truck will drive through the portal monitor a second time. If the alarm occurs the second time (ruling out random background fluctuation as a cause of the first alarm) then the truck will be directed to the alarm investigation laydown area, where the contents of the truck will be dumped onto a prepared surface and spread with a bulldozer, or equivalent piece of machinery, in an approximate 6-inch depth layer. The truck will remain in the alarm investigation area. The 6-inch layer of soil will then be surface scanned by walking the entire soil surface in a serpentine pattern with a standard 2-inch by 2-inch NaI gamma scintillation detector. A technician will scan the surface of the soil with the detector at a height of no more than 6 inches from the soil surface. In the event that an object with the elevated reading is found, a one minute static count will be taken with a hand-held meter with the detector located no more than 2 inches above the object. Notifications will be made to cease excavations from the area where the soil load originated from. Prior to the investigation, specified Personal Protective Equipment (PPE) will be donned. The requirements of the attached HASP will be followed (see Appendix 2). In addition, the on-site NYSDEC Site Monitor will be notified. If it appears that there is a localized spot of activity (<10 square foot), the soil may be excavated and placed in a container for further evaluation. If characterization is desired, the Sitewide Radiological Investigation Soil Sampling Plan (Sampling Plan) will be followed. All laboratory results will be submitted to the NYSDEC with the monthly Environmental Report for the month in which the sample was collected. Prior to leaving the laydown area, the haul truck will be scraped clean, if necessary, and radiologically scanned to insure no residual contamination is left in the truck.

G. Operator Training

Health Physics Technicians (Rad Techs) will be stationed at the portal detectors (only during use) and perform necessary hand scanning, clearance surveys of trucks and equipment, general radiological health and safety monitoring and quality control of all the radiation detection equipment during the project. The technicians will have at a minimum current certification for:

- 29 CFR 1910 OSHA 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER); and
- 10 CFR 835 Radiation Worker II

The technicians will also have appropriate training and experience for the equipment to be utilized and to qualify as an ANSI Class I or Class Health Physics Technician. A certified health physicist will be available by phone for immediate consultation as needed.

V Chemical Detection

The footprint of the proposed RMU-2 landfill and the other areas related to the RMU-2 project, cover several former solid waste management units (SWMUs) at the facility (see figure in Appendix 3). CWM responsible SWMUs (NYSDEC, Part 373 Permit) in the project areas include:

- Fac. Pond 3 (DA-30)
- Fac. Pond 8 (DA-26
- Drum Storage Building (DA-4)
- Mac Arthur Street Between Main & “J” Streets (DA-7-1a)
- Heavy Equipment Maintenance Building/Sump
- All of Group D SWMUs (former Lagoon 3 &4, Trailer Parking Area, Drum Storage East of Lagoon 2) (DA-24)
- Railroad line north of ‘M’ street
- Monitoring Well W1002S
- Piezometer P1202S

Closure procedures for Fac Pond 3 (DA-30) and the Drum Management Building (DA-4) are provided in the Sitewide Closure Plan of CWM's 6 NYCRR Part 373 Permit. Upon closure of these units, chemical constituents are not anticipated to be located within these areas. Fac Pond 8 has been inactive since 2004 and is currently undergoing closure. The remaining closure activities for Fac Pond 8 include the removal of soil in the north berm containing radiological constituents above established cleanup levels for the pond and regrading of the pond. The Sitewide Closure Plan includes procedures for collection of soil samples to verify clean closure of Fac Pond 3 and the Drum Management Building. Following closure of these areas in accordance with the Sitewide Closure Plan, the procedures described below for monitoring and management of soils excavated from these areas will be followed.

No chemical contamination is anticipated to be in the Mac Arthur Street Between Main & "J" Streets (DA-7-1a) or Heavy Equipment Maintenance Building/Sump areas based on historical investigations (Golder, 1993). The procedures described below for monitoring and management of soils excavated from this area will be followed.

Residual contamination may be present in portions of Group D SWMU (DA-24), which includes former Lagoons 3 & 4, Trailer Parking Area, and Drum Storage East of Lagoon 2. The Full and Empty Trailer Parking Areas will be closed in accordance with the Sitewide Closure Plan. The Sitewide Closure Plan includes procedures for collection of soil samples to verify clean closure of the Full and Empty Trailer Parking area. Following closure of these areas in accordance with the Sitewide Closure Plan, the procedures described below for monitoring and management of soils excavated from these areas will be followed.

A portion of the former railroad line north of "M" Street is located within the footprint of RMU-2. Based on previous investigations, residual contamination remains in this area. The railroad bed material and residual contamination will be excavated and will be segregated and characterized for disposal. Confirmatory soil samples will be collected from the alignment of the former railroad bed and analyzed for Priority Pollutant Metals and Organics. Following removal of the former railroad bed and residual contamination and sampling, the procedures described below for monitoring and management of soils excavated from this area will be followed.

SWMUs identified as Monitoring Well W1002S and Piezometer P1202S are located outside of the excavation limits for development of RMU-2 and related facilities. The procedures described below for monitoring and management of soils excavated from these areas will be followed. If contamination is found during excavations near these areas, the procedures described below for characterization and disposal of contaminated soil will be followed.

Third Party SWMUs that are not the responsibility of CWM but may or will be affected by RMU-2 development include:

- Former Lake Ontario Ordnance Works (LOOW) utility lines and structures
- Trash Pit
- Air Force Drum Areas 2 & 3 (DA-46 & DA-47) (aka Drum Area C)
- Waterline Excavation Area III (DA-50)
- Former Navy Interim Pilot Plant Disposal areas

- Property "G"

Portions of Former LOOW utility lines (EA, 2008) and structures may be located within the footprint of RMU-2 (see figure in Attachment 3). The Former LOOW utility lines and structures located within the footprint of RMU-2 will be removed and segregated and characterized for proper disposal. If contamination is found during excavations for removal of these utilities and structures, the procedures described below for characterization and disposal of contaminated soil will be followed. Confirmatory soil samples will be collected upon removal of contaminated soil and analyzed for Priority Pollutant Metals and Organics and explosives related to TNT manufacturing.

A burn pit/trash pit was discovered by CWM during an excavation to install leachate lines for the leachate hydraulics controls upgrade (LHCU). Investigations by the US Army Corp of Engineers (EA, 1999) indicate that the trash pit is Department of Defense (DOD) and Navy IPPP waste. Prior to excavating in this area, historical reports will be reviewed for location and extent of the trash pit. The debris and contaminated soil in trash pit will be removed, segregated, and characterized for proper disposal. Confirmatory soil samples will be collected upon removal of debris and contaminated soil and analyzed for Priority Pollutant Metals and Organics and lithium and boron. Following removal of the trash pit and residual contamination and sampling, the procedures described below for monitoring of the excavations in this area will be followed.

The Air Force Drum Areas 2 & 3 (DA-46 & DA-47) (aka Drum Areas C & D) are not located within the excavation areas for RMU-2 and related facilities (EA, 1999 & 2002. The procedures described below for monitoring and management of soils excavated from these areas will be followed.

Historical investigations in the Waterline Excavation Area III (DA-50) and Former Navy Interim Pilot Plant Disposal areas indicate that there is no or minimal impacts from former DOD (former LOOW) or Navy IPPP activities in these areas (EA, 1999). The procedures described below for monitoring and management of soils excavated from these areas will be followed.

CWM is proposing to construct wetlands mitigation in a portion of the Property "G" area currently used by CWM as topsoil stockpiles. Historic investigations (EA, 1999) indicate the area CWM is proposing for construction of the wetlands mitigation appears to have minimal impacts from historic DOD operations. The procedures described below for monitoring and management of soils excavated from these areas will be followed.

In addition to investigations performed by CWM and the DOD/USACE, CWM performed subsurface investigations in the RMU-2 footprint and other areas impacted by the project. As part of the Model City facility's RMU-2 Subsurface Investigation performed in 2008 and early 2009, volatile organic compounds (VOCs) screening was performed on all of the sample borings obtained in the RMU-2 footprint and other areas impacted by the project. Based on this data and sample locations, most areas included in this project exhibited field meter readings less than the action level of 10 parts per million (ppm) VOCs. Areas greater than 10 ppm VOCs were sampled and analyzed in the laboratory. All samples showed non-detect for VOCs. Based on work performed to date, most areas to be included in this project are not expected to have significant levels of VOC contamination.

Hand held VOC screening of areas of known contamination (SWMUs), identified above, will be performed during closure of these. Upon closure of these areas, the procedures for the management of the soil excavated from these areas will follow the procedures in Section V.A & C.

Hand held VOC screening of the soil during excavation of non-SWMU areas, as provided in the approved CWM "Generic Small Project Soil Excavation Monitoring and Management Plan" (Generic Plan), is believed to be impractical and unsafe for the RMU-2 project. This is based on the large volume of soil to be excavated for the project which will require the use of large excavation equipment, and the requirement for an instrument operator to be continuously in close proximity to the equipment. In addition, false positive readings may occur from the exhaust of the heavy equipment and haul trucks in the immediate area. For these reasons, soils will not be scanned for chemical impact at the excavation site. Rather, the potential for significant VOC contamination will be determined through visual or olfactory observations (e.g., discoloration, oil sheen, organic smell) by the equipment operator or other construction personnel. If any such observations are noted, the excavation will be temporarily halted and the CWM project engineer or designee will be contacted for field review. Based on the field observations, suspected contaminated material will be segregated and handled as described in the Soil Management section of this Plan.

At the completion of the excavation (or phase of excavation if done in stages), the entire excavation area floor will be hand-scanned for chemical impact following the procedures specified in the Generic Plan.

A. VOC Scan Procedure and Instrumentation

For the RMU-2 project, excavated soil will be transported from the excavation area, will pass through the radiation portal (as specified above) and will be unloaded in a predetermined laydown area. The soil will then be spread out in approximately a six-inch-thick layer by a bulldozer or equivalent machinery, and hand scanned for volatile organic vapors. For soils that exceeded the radiation portal alarm, chemical screening will be performed concurrent with the radiation screening as described in Section IV(F) of this Plan.

The spread soils will be screened for VOCs using an air monitoring meter equipped with a photo ionization detector (PID) with a 10.6 eV. lamp such as MiniRae 2000 or equivalent. The use of meters equipped with a PID are proposed for this construction project application rather than an FID (as used in the Generic Plan) based on the following benefits:

- Lower detection limits for VOCs
- Smaller, lighter and less complicated to use
- FIDs require the use and replacement of hydrogen gas, possible safety hazards and flame out can occur requiring restarting of the instrument
- Flammable atmospheric gasses are not expected to be present

- More reliable, long lamp life
- Lower cost to purchase and operate

B. Instrument Response Criteria and Scan Procedure

An audible/visible alarm in the meter (in addition to the numeric display) will be set as an additional indication to the meter operator whether the PID has detected VOC levels of greater than 10 ppm. If a reading above 10 ppm is obtained, the soil will be considered to be potentially chemically contaminated. In addition, if discoloration of excavated material is noted or a colored sheen is observed on water present, both in the excavation area or in the laydown area, chemical contamination will be suspected. In these instances, CWM's Contamination Control Program (HS-1144) and Personal Protective Equipment (HS-1161) procedures will be followed. Potentially contaminated soil will be containerized rather than stockpiled to prevent dispersion or run-off of contaminants. The PID meter will be calibrated on a daily basis prior to use according to manufacturers specifications and the battery will be charged to ensure a full shift's availability of use.

C. Soil Management

Based on the information obtained during the VOC screening at the excavation sites for SWMU areas or at the soil screening location, the soil will be assigned one of the following four categories for management.

1. **Historic data and screening procedures do not indicate the presence of chemical contamination.** Soil may be used for backfill, placed in a soils stockpile for future use on-site or placed in the landfill as a non-hazardous waste.

2. **Historic data indicates the potential presence of chemical contamination in the excavated soil, but no chemical contamination is detected by the screening procedures.**

    a. The soil will be excavated and placed into a separate stockpile. A representative sample or samples will be collected and analyzed for Priority Pollutant Metals and Organics. Representative samples from the LOOW utility/structures areas will also be analyzed for explosives that are related to TNT manufacturing. Representative samples from the trash pit area will also be analyzed for lithium and boron. Results of this analyses will be submitted in the Environmental Report for the month in which the sample was collected.
        i. If the PCBs are >1 ppm, the soil will be placed or used in the landfill.
        ii. If the PCBs are >50 ppm, the soil will be managed as a hazardous waste.
        iii. Results will evaluated according to 6 NYCRR Part 375-2.7(d) and the results compared to 6 NYCRR Part 375-6.8(b) criteria for industrial use sites. If the results are below the industrial use criteria the soil may be placed in a soil stockpile for future use.

iv. If any constituents are present detected above industrial use criteria, the historical activities for the area will be considered to determine if any listed waste codes apply. The constituent concentration(s) will be evaluated to determine if any are high enough that the soil could qualify as characteristic. If the soil qualifies as a hazardous waste, the constituent concentrations will be reviewed against the Universal Treatment Standards (UTS) to determine if the soil meets the Land Disposal Restriction (LDR) standards or the alternate soil standards. If the soil meets either of these standards, then it will be landfilled as a hazardous waste after the completion of the appropriate paperwork (LDR form).

b. An economic based conservative assumption may be made and the soil managed as a RCRA/TSCA waste for incineration disposal in lieu of completing PCB and VOC testing.

3. **Historic data does not indicate the potential presence of chemical contamination in the excavated soil, but chemical contamination is detected by the screening procedures**. Follow 2.a.or 2.b. above.

4. **Historic data and screening procedures indicate the presence of chemical contamination in the excavated soil**. Follow 2.a. or 2.b. above.

Where sampling and analysis is specified, representative sample(s) will be collected by CWM laboratory or environmental personnel in accordance with the facility's Waste Analysis Plan (WAP) and tested by CWM or another ELAP/NELAP certified laboratory.

D. Operator Training

Technicians performing VOC screening will have at a minimum current certification for:

- 29 CFR 1910 OSHA 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER).

VI Laboratory Debris

In the event that the excavation of soil uncovers any items indicating the presence of laboratory waste (such as test tubes, petri dishes, animal bones, or instruments), excavation activities will cease in the affected area. CWM will immediately notify the NYSDEC on-site monitors and radiation control program staff.

All samples of such debris will be analyzed in accordance with the Sitewide Radiological Investigation Soil Sampling Plan. In addition, the samples will be analyzed for isotopic plutonium.

VII Reporting

The daily data from the radiological and chemical contamination monitoring will be compiled and summarized and added to the project documentation and certification reports. A copy of these daily summary reports will be included with the monthly Environmental Report for the month in which the data is collected. In addition, the reports will be available for review by the NYSDEC Site Monitors. Examples of daily reports are included in Appendix 4.

VIII Health and Safety Plan

A project-specific Health and Safety Plan has been developed by CWM Chemical Services for the RMU-2 project. A copy of this Health and Safety Plan is included in Appendix 2.

IX References

EA Engineering, Science, and Technology, Inc. 1999. Final Report of Results for the Phase I Remedial Investigation at the Former Lake Ontario Ordnance Works, Niagara County, NY. Prepared for the U.S. Army Corps of Engineers, Baltimore District. July.

EA. 2002. Final Report of Results for the Phase II Remedial Investigation at the Lake Ontario Ordnance Works, Niagara County, New York. February.

EA Engineering, Science and Technology, Inc. 2008. Report of Results for the Remedial Investigations of Underground Utility Lines, Formerly Used by the Department of Defense, Lake Ontario Ordnance Works (LOOW), Niagara County, NY. Final. September.

Golder. 1993. Final Report: RCRA Facility Investigation Report CWM Chemical Services, Model City Facility, Model City, New York. January.

APPENDIX 1

PORTAL MONITORING EQUIPMENT

Downloadable Files:

ASM II 3, 45,6 Datasheet (97 Kb)

ASM II 3000E, 4500E, 6000V

The ASM vehicle monitoring systems are designed to provide the ultimate sensitivity for vehicle scanning in industrial applications.

Product Detail

The ASM/II vehicle monitoring systems are designed to utilize industry-proven detector designs, state-of-the-art detection algorithms, and advanced, lownoise electronics technology. This combination provides the perfect solution for vehicle monitoring applications, requiring the lowest possible alarm thresholds. The ASM/II vehicle monitoring systems offer unparalleled sensitivity and reliability.

Detector configurations that provide both vertical coverage of the vehicle (detector height) as well as dwell-time (detector width) have been the cornerstone of ASM detector designs since 1987. These large-area plastic scintillation detectors are shock-mounted and used in lead-lined, NEMA rated stainless steel detector enclosures, and are proven to withstand the rigors of industrial vehicle monitoring applications in the harshest environments.

Data analysis and management is processed by the ASM/II System Control Unit, which is designed to be operated with little operator intervention. The ASM/II SCU features simple, one-button response to alarm conditions while providing detailed scan and alarm data via the builtin printer.

- Alphanumeric display
- Built-in printer
- Modem included
- Simple to operate and maintain

Related Products

Product#	Product Name	Image	
EID-101227 90	**ASM II 6000, 9000, 12000**		Select
ASM III 3, 45, 6	**ASM III 3000E, 4500E, 6000V**		Select

Purchase Details

SKU : ASM II 3, 45, 6

Request Quote

Product Contact

Sales Contact

United States +1 800 :

Specifications:

Detector material :	Pre scir
Radiations detected :	Lov ene em 241 19: neu
Detection surface area :	Ove in2 mo
Electronics :	Rer hig phc vol ass pul disc line
Housing :	Lea ste (NE gas coa acc
Simple operator control :	A s illu rad occ pus the the

EID-101227 91	**ASM III 6000, 9000, 12000**		Select
ASM III Sy stem	**ASM III Vehicle Monitoring System**		Select

Product Specifications

The ASM Vehicle Monitoring Systems are designed to provide the ultimate sensitivity for vehicle scanning in industrial applications.

ASM/III

Model 3000E, 4500E and 6000V Vehicle Monitoring Systems

ASM-6000V/III

ASM-4500E/III

ASM-3000E/III

- Graphic display
- Language options
- User configurable alarm messages
- Simple to operate and maintain
- Built-in printer
- Modem included

The ASM/III vehicle monitoring systems are designed to utilize industry-proven detector designs, state-of-the-art Reality-Based Detection algorithms, and advanced, low-noise electronics technology. This combination provides the perfect solution for vehicle monitoring applications, requiring the lowest possible alarm thresholds. The ASM/III vehicle monitoring systems offer unparalleled sensitivity and reliability.

Detector configurations that provide both vertical coverage of the vehicle (detector height) as well as dwell-time (detector width) have been the cornerstone of ASM detector designs since 1987. These large-area plastic scintillation detectors are shock-mounted and housed in lead-lined, NEMA rated stainless steel detector enclosures, and are proven to withstand the rigors of industrial vehicle monitoring applications in the harshest environments.

Data analysis and management is processed by the ASM/III System Control Unit, and is available in two configurations; a wall mountable unit, incorporating an industrial grade PC with touch-screen graphic display or a desktop pod operated with a commercially available PC. Designed to be operated with little or no operator intervention, the ASM/III SCU features simple, one-button response to alarm conditions, while providing detailed scan and alarm data at the request of the operator. A color graphic display allows the viewing of detector data, alarm history and location of the detected source in the vehicle.

ASM Specifications

DETECTOR ASSEMBLIES

- ASM3000E - 2 detector modules
- ASM4500E - 3 detector modules
- ASM6000V - 4 detector modules

Detector material:
- Premium plastic scintillator

Radiations detected:
- Low, medium and high energy gamma emitters, for example, ^{241}Am, ^{60}Co, ^{137}Cs, ^{192}Ir, ^{226}Ra/Th, also neutrons

Detection volume:
- Over 23 l (1400 in^3) per detector module

Detection surface area:
- Over 0.45 m^2 (700 in^2) per detector module

Vehicle separation:
- 4.8 m (16') or less for optimum performance, (4.25 m (14') recommended)

Electronics:
- Remote single channel, RS485 controlled, intelligent high-voltage/ bias/ amp. digitizer electronics

Vehicle speed sensors:
- Heavy duty industrial grade photobeams with cowling for weather and damage protection

Cable & Communication:
- Remote controlled data transmission through 2 independently shielded 20 AWG twisted pair cables.

Housing:
- Lead lined, stainless steel, weatherproof (NEMA rated) with gasketed, hinged, coated aluminum access door

Temperature ranges:
- -40 °C to +50 °C (-40 °F to 122 °F)

Relative Humidity:
- 10 to 95% RH

Dimensions:
- 183 H x 45 W x 30 D cm (72" H x 18" W x 12" D)

Weight:
- 181 kg (400 lb) per assembly

Installation:
- Mounting hole pattern for installation on client-provided I-beams

CONTROL UNIT

Sensitivity:
- Maximum sensitivity is set automatically. Radiation increases equivalent to 8 - 10% of background are detectable

Vehicle speed:
- Up to 5 mph (8 kph) with audible and visual alarms if the limit is exceeded.

Indicator lights:
- Panel Lights: ready (green), wait (amber), alarm (red)

Illuminated controls:
- alarm override (amber),
- toggle display (green),
- alarm acknowledge (red)

Simple operator control:
- A single push-button illuminates when a radiation alarm occurs.
- Pressing the push-button silences the alarm and resets the system

Background compensation:
- Automatic

Phone modem:
- Telephone link to easy maintenance teleservicing network

Other controls:
- Power ON/OFF; keyboard provided for system setup, (password protection, self-test & maintenance) but not required for day-to-day operation.

Self-diagnostics:
- Detector operation, wiring integrity and photocell alignment are monitored by internal self-tests. For added reliability, separate hardware monitors the microprocessor

Mountings:
- Wall-mounting is standard, other styles are optional

Temperature range:
- 4 °C to 35 °C (40 °F to 95 °F)

Relative humidity:
- 10% to 75%

Dimensions of wall-mounted control unit:
- 600 H x 380 W x 204 D mm (24" H x 15" W x 8" D)

Power:
- 117 VAC, 60 Hz or 220 VAC, 50 Hz

Cable:
- NEMA 15-5 3 terminal plug on 2 m (6') lead

System shipping weight:
- ASM 3000: 455 kg (1000 lb)
- ASM 4500: 682 kg (1500 lb)
- ASM 6000V: 864 kg (1900 lb)

Worldwide
Frauenauracher Strasse 96 — +49 (0) 9131 909-0
D 91056 Erlangen, Germany — +49 (0) 9131 909 205 fax

United Kingdom
Bath Road, Beenham, — +44 (0) 118 971 2121
Reading RG7 5PR United Kingdom — +44 (0) 118 971 2835 fax

United States — +1 (508) 520 2815
27 Forge Parkway — +1 (800) 274 4212 toll free
Franklin, MA 02038 USA — +1 (508) 428 3535 fax

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APPENDIX 2

CWM HEALTH AND SAFETY PLAN FOR RMU-2 SOIL EXCAVATION AND MONITORING PLAN

CWM CHEMICAL SERVICES, LLC.
MODEL CITY FACILITY

HEALTH AND SAFETY PLAN FOR THE RMU-2 PROJECT SPECIFIC SOIL EXCAVATION MONITORING AND MANAGEMENT PLAN

October 2009
(Revised November 2013)

TABLE OF CONTENTS

TABLES

ATTACHMENTS

ACRONYMS AND SYMBOLS

AHA	Activity Hazard Analysis
ALARA	As Low As Reasonable Achievable
ANSI	American National Standards Institute
APR	Air Purifying Respirator
CPR	Cardio-Pulmonary Resuscitation
CHP	Certified Health Physicist
CIH	Certified Industrial Hygienist
CSP	Certified Safety Professional
EMR	Experience Modification Rate
FSP	Field Sampling Plan
GPS	Global Positioning System
HASP	Health and Safety Plan
HEPA	High Efficiency Particulate Air
LWCR	Lost Workday Case Rate
MSDS	Material Safety Data Sheet
MSL	mean sea level
OSHA	Occupational Safety and Health Administration
PE	Professional Engineer
PPE	Personnel Protective Equipment
Ra	Radium
Scan MDC	Scan Minimum Detectable Concentration
SMS	Safety Management Standards
SSHP	Site Safety and Health Plan
Th	Thorium
U	Uranium

1.0 PURPOSE AND OBJECTIVE

The purpose of this Health and Safety Plan (HASP) is to present guidelines to be utilized by CWM, Contractor, and Consultant personnel for site activities involving soil disturbance and excavations associated with the Residuals Management Unit No. 2 (RMU-2) landfill project at the CWM Model City Facility. The intent of this plan is to focus on the radiological testing and investigative sampling of soils rather than actual excavation methods and construction activities.

The objective of this HASP is to provide a mechanism for establishing safe working conditions for personnel of contracted companies working for CWM at the Model City Facility. The safety organization, procedures, and protective equipment have been established based upon an analysis of potential physical, chemical, radiological, and biological hazards. Specific hazard control methodologies have been evaluated and selected to minimize the potential of accident, injury, and exposure.

Activities covered under this HASP include a pre/post gamma walkover surveys, monitoring during excavation and sampling activities. CWM, contractor, and consultant personnel on a project must meet the training requirements of 29 CFR 1910.120(e) and participate in a medical surveillance program per 29 CFR 1910.120(f).

The Project Manager and Site Health & Safety Specialist are responsible for implementation of this plan with assistance from the Site's Technical Manager. Safety procedures will be performed in accordance with applicable OSHA standards and established CWM Health & Safety procedures and requirements.

2.0 PROJECT LOCATION

The CWM Chemical Services, LLC (CWM) Model City facility site occupies approximately 710 acres comprising approximately 450 developed acres and approximately 260 acres of wooded space that surrounds the developed portion. The site is located in the Erie-Niagara Region of western New York State. The facility is situated on the boundary between the Towns of Lewiston and Porter in Niagara County. Lake Ontario is north of the site. The site's address is 1550 Balmer Road, Model City, New York 14107.

3.0 SITE DESCRIPTION AND HISTORY

The CWM Model City Facility is a hazardous waste management landfill. Its active units are permitted as part of the Model City Treatment, Storage, and Disposal Facility (TSDF). The site uses permitted state of the art technologies for the proper storage, treatment, and disposal for a variety of liquid, solid and semi-solid organic and inorganic hazardous waste and industrial non-hazardous waste. Site capabilities include Aqueous Wastewater Treatment System, waste stabilization, secure landfilling of approved waste solids and semi-solids including PCBs, solvent and fuel blending processes, and storage and disposal of wastes regulated under the Resource conservation and Recovery Act (RCRA) and Toxic Substances Control Act (TSCA).

The Model City facility began TSDF operations in 1971 as Chem-Trol Pollution Services, Inc. Due to corporate acquisitions and name changes, CWM Chemical services, LLC, a subsidiary of Waste Management, Inc. (WMI) is the present owner and operator of the facility. WMI is based in Houston, Texas.

Prior to operation as a commercial waste facility, the site was owned by the U.S. Government (early 1940s through the mid 1960s) and was part of the Lake Ontario Ordinance Works (LOOW). U.S. Government activities at and in the vicinity of the site included:

- Explosives and solid/liquid fuel propellant research, development and production.
- Research, development and waste storage related to the Manhattan Project.
- Detonation of outdated or off-specification explosives.

Some of these activities resulted in the contamination of certain areas of the site with organic and inorganic chemicals and low level radioactive wastes. During the 1960s, prior efforts to decontaminate the site were made by the U.S. Atomic Energy Commission (AEC) and the U.S. Department of Energy (DOE). In 1993, CWM concluded its own investigation into the nature and extent of contamination in soil and groundwater throughout the facility (including low level radioactive contamination) with the submission of a RCRA Facility Investigation (RFI) Summary Report to the New York State Department of Environmental Conservation (NYSDEC). The corrective Measures Study was completed in 1996, proposing measures to address the contaminated areas. In 2001, NYSDEC revised the CWM permit to include these corrective measures, which were recently completed by CWM.

Due to potential for historical residual radiological contamination from the previous U.S. Government activities, the New York State Department of Health (NYSDOH) issued an order (4/27/72) for approximately 614 acres of former LOOW property which imposed certain restrictions on the future use of said property, until such time that the radioactive emissions were reduced to acceptable levels. On June 21, 1974, NYSDOH issued a Supplemental Order which amended the 1972 Order related to 240 acres of the property then owned by Chem-Trol.

As a result of extensive corrective remedial actions taken at the CWM property since the 1972 Order, on May 7, 1992, the DOE certified that the majority of the CWM property was "in compliance with applicable (radiological) decontamination criteria and standards" and provided "assurance that future use of the property will result in no radiological exposure above DOE criteria and standards established to protect members of the general public or site occupants". Decontamination was certified for all properties owned by CWM, with the exception of three properties designated as E, E' and G. These properties were excluded from the decontamination certification because an area within each property could not be properly assessed due to inaccessibility and the DOE could not confirm that contamination did not exist in these areas. The three inaccessible areas were (1) soil beneath Lagoon 6 and the berm surrounding that lagoon on Property E, (2) soil beneath a roadway and PCB storage tanks on Property E', and (3) soil beneath the liquid treatment pond on the western edge of Property G.

Based on the May 7, 1992, USDOE letter, on December 23, 2003, CWM requested that the NYSDOH execute an order to rescind and vacate the 1972 and 1974 Orders for all CWM property, except properties E, E' and G. After reviewing all historical documentation and data related to the areas covered by the Orders, both in the NYSDOH files and provided by CWM, the NYSDOH determined a potential for residual radiological contamination still exists and that monitoring is necessary prior to and during any excavation activities. In order to address this concern, the NYSDEC included permit condition J.3.a. in Module II (Corrective Action) of CWM's Sitewide Permit.

4.0 RESPONSIBLE PERSONNEL

Position	***Name***	***Site Phone#***
Project Manager	Stephen Rydzyk	716-286-0325
Site Technical Manager	Jill Banaszak	716-286-0246
Site H & S Specialist/EMT	Tim Fogarty	716-286-0331
District Manager	Michael Mahar	716-286-0241
Certified Health Physicist	Varies	TBD
Site Health Physicist	Varies	TBD
Site Maintenance Manager	Stephen Rydzyk	716-286-0325
Site Engineer	Stephen Rydzyk	716-286-0325
Laboratory Manager/EMT	Ami Lis	716-286-0295

All personnel must adhere to these procedures during the performance of their work. Each person is responsible for completing tasks safely, and reporting any unsafe acts or conditions to his immediate supervisor. No person may work in a manner which conflicts with these procedures. After due warnings, the Project Manager will dismiss from the site any person who violates the safety procedures.

The Project Manager is ultimately responsible for verifying that all project activities are completed in accordance with the requirements of this HASP. The Project Manager is also responsible for providing project personnel with the appropriate information regarding the project activities to insure compliance with this HASP.

A Certified Health Physicist developed the technical health and safety aspects of this plan. The Site H & S Specialist and/or a Certified Health Physicist may be consulted at any point during the project excavation. The project Manager or Site H & S Specialist is responsible for:

- Conducting on-site safety orientation for contractors/consultants,
- Conducting safety audits of work activities to insure compliance with this HASP,
- Maintaining required H & S documents and records,
- Stop project activities when threshold chemical or radiological levels are reached.

All personnel must read and acknowledge their understanding of this HASP, abide by the requirements of the HASP, and cooperate with site supervision in ensuring a safe work site. Site/contractor/consultant personnel will report any of the following to the Project Manager or Health & Safety Specialist:

- Accidents or injuries, no matter how minor,

- Unexpected or controlled releases of chemical substances,
- Symptoms of chemical or radiological exposures,
- Unsafe or malfunctioning equipment,
- Changes in site conditions that may affect the health and safety of project personnel,
- Damage to equipment and property, and;
- Situations or activities for which they are not properly trained.

5.0 EMERGENCY CONTACT INFORMATION

Hospital/Clinic:	Mount St Mary's Hospital 5300 Military Rd, Lewiston, NY 14092, US
Paramedic:	Site Extension 0200 (Emergency Number) or (716) 286-0200 from an outside line or mobile phone
Fire:	Site Extension 0200 (Emergency Number) or (716) 286-0200 from an outside line or mobile phone
Police Department:	Site Extension 0200 (Emergency Number) or (716) 286-0200 from an outside line or mobile phone
Site Guard House:	Site Extension 0221 or (716) 286-0221 from an outside line or mobile phone
Site Health/Safety ERT Incident Commander	Tim Fogarty (716) 286-0331

6.0 EMERGENCY/CONTINGENCY PLAN

Refer to Attachment A for details regarding CWM's Emergency Evacuation and Response Procedures. Summarizing the procedure:

In the event the first siren alarm is activated,

- Remain at work location unless in the immediate danger area.
- Vehicular traffic will pull as far to the right side of the road as possible and stop unless directed otherwise.
- EMERGENCY VEHICLES HAVE THE RIGHT OF WAY AT ALL TIMES
- Follow instructions of facility personnel if roads passage is obstructed.
- FACILITY TELEPHONES AND PLANT RADIOS ARE RESTRICTED TO EMERGENCY COMMUNICATION ONLY.

If the second siren is activated,

- Report to Old Transportation Garage area or Alternate Locations which are Main Plant Entrance, SPEC (Admin) Building or SPEC Building East Parking Lot
- Check in with CWM personnel to insure accountability
- Wait for further instructions from CWM.

Following initiation of emergency notifications, all personnel will remain at either Primary or Secondary Reporting Location until directed to leave by the Emergency Coordinator. No one may leave without notification to the Emergency Coordinator.

7.0 CHEMICAL HAZARDS

A variety of chemical non-radiological wastes were disposed of at the CWM Facility. However, the site has stable cover over all areas that will be assessed during this project, which will minimize any potential for worker exposure to these wastes. Volatile and/or soil-borne exposures are not anticipated based on the presence of the cover. As a result, the typical level of protection will be Level D.

If the excavation will take place in an area identified as having VOAs >1 ppm during the facility's RFI, chemical contamination will be expected to be present. In these areas, or if obvious chemical contamination is noted in any area (eg. odor, discoloration) CWM's Contamination Control Program (HS-1144) and Personal Protective Equipment (HS-1161) (refer to Attachment B) procedures will be followed.

8.0 RADIOLOGICAL ASSESSMENT, FIELD SAMPLING AND EXCAVATION

This section is specific to on-site excavation activities to conduct radiological measurements, assess and evaluate those measurements to permit CWM to complete construction of the RMU-2 project.

During excavation activities, personnel from the radiological support staff will evaluate field instrument readings to determine the extent of the hazard potential based on known or suspected radionuclides present at the facility. Based on knowledge of site contaminants being from the U-238 decay chain, survey instruments will be selected based on response to gamma emissions. The usual instrumentation will be a 2" x 2" sodium iodide (NaI) detector. A graded approach to the radiation protection of personnel performing excavations is presented in this section. Site activities may also involve collecting soil and sediment samples and the shipment of the samples to a pre-qualified laboratory for analysis.

The RMU-2 project includes soil excavations within the footprint of the landfill, as well as excavations associated with the construction of facilities which are located within the footprint and have to be relocated to other areas of the site. Small excavations may be completed in accordance with the Generic Small Project Soil Excavation Monitoring and Management Plan. Larger excavations will be completed as described in the RMU-2 Project Specific Soil Excavation Monitoring and Management Plan, including use of a vehicle portal monitoring system and hand surveys. Due to the limitations of radiation survey equipment, no more than 15 cm of depth may be assessed in any one set of measurements.

Radiological support includes pre-excavation screening of the intended area, where necessary, management of the detection portals and surveying of the excavated soils. Qualified personnel will record and evaluate screening results.

8.1 RADIOLOGICAL ASSESSMENT

The radionuclides that are suspected to be of a concern at the Model City Facility include the following:

- Ra-226 (includes progeny through stable Pb-206)
- Th-230 (does not include any progeny)
- U-238 (includes progeny Th-234, Pa-234m and Pa-234)

In general the radionuclides listed above are readily detectable except for the Th-230. Because of this technological shortfall, it must be assumed that the Th-230 will not exist in the absence of other more detectable radionuclides. This is a reasonable assumption since any thorium-only waste streams would include Th-232 and all associated decay products, which would emit detectable levels of gamma radiation. Because the activities addressed in this section are related to site workers, the exposure routes are limited to external exposure to radiation and internal exposure to radioactive materials by inhalation, ingestion or wounds. Site workers covered by this section are considered to be Members of the Public from an exposure control perspective. The limit for members of the public from a licensed activity is 100 mrem per year. Though these workers have been trained in radiation protection and might otherwise be considered to be radiation workers who could receive up to 5,000 mrem per year, this section covers site activities at a much lower level of risk.

If this limit is divided equally between internal and external dose, each is equal to 50 mrem. Assuming that excavation work is not the primary function of the personnel, it has been estimated that such activities would take no more than 200 hours per year, on average. Based on this amount of time, the <u>average</u> exposure should not exceed 50 mrem/200 hours or 0.25 mrem/hour. The field instruments consist of sodium iodide detectors and pancake Geiger Mueller (PGM) detectors. The response of these instruments, based on their manufacturer's literature, are 900 counts per minute (cpm) per urem h^{-1} and 3300 cpm/mrem h^{-1}, respectively. Therefore, the 0.25 mrem/h (which is equal to 250 urem/h) corresponds to a value of 225,000 cpm for the NaI. The corresponding equivalent for the PGM is significantly lower at approximately 800 cpm. With either of these instruments, field assessment of the exposure potential is possible.

Conversion of count rates to dose rate are an approximation considering the broad energy range of the radionuclides that may be present at the facility. Therefore, the contractor will obtain a dose rate meter such as a Biron Micro-Rem or similar to perform actual dose rate surveys.

The 50 mrem internal dose limit is addressed by a review of the published information on the regulatory Annual Limit of Intake (ALI), as set by the Nuclear Regulatory Commission in 10 CFR 20, Appendix B, and repeated in 6 NYCRR 380, Table 1. For the purpose of this Addendum, the ALI is the amount of radioactivity for a particular isotope that corresponds to a dose to a person of 5 rem per year (5,000 mrem). Therefore, 1% of the ALI is equal to 50 mrem. The ALIs for these radionuclides, based on assumed conditions of equilibrium and implied radionuclides present are:

TABLE 8-1

Parent Radionuclide	**Regulatory Levels (ALI)** *Ingestion (μCi)*	*Inhalation (μCi)*	**Allowable Intake (1% of ALI)** *Ingestion (μCi)*	*Inhalation (μCi)*
Ra-226	0.4	0.05	0.004	0.0005
Th-230	4	0.006	0.04	0.00006
U-238	9.6	0.04	0.096	0.0004

It is important to observe that the above values reflect the assumption that Ra-226 is in equilibrium with its progeny through to stable lead and that U-238 is in equilibrium with Th-234 and Pa-234m/Pa-234. Very little additional U-234 would be added from the U-238. Th-230 decays to Ra-226 but very little additional Ra-226 would be present from decay of Th-230. The ALIs were calculated as mixtures as discussed in 10 CFR 20 Appendix B.

The annual level of effort of 200 hours of work at 8 hours per day corresponds to 25 days. The ingestion of soil incident to excavation work is assumed at a rate of 400 mg per day. The total amount of soil ingested in 25 days would be 10 grams. Using 1% of the lowest ingestion ALI (Ra-226), this corresponds to 0.004 uCi/10 grams or 0.0004 uCi/g. This is also equal to 400 pCi/g. The dose rate from a small patch of (~1 ft^2) soil 15 cm deep at only 40 pCi/g of Ra-226 is about 13 urem/h at 6”; a 1 m^2 area at this concentration would result in a dose rate of ~44 urem/h. These are a very detectable condition that is readily identifiable by the radiological control staff. U-238 and its progeny (discussed above) will result in a 10% higher dose rate than this. Elevated readings at these concentrations would be investigated and would be within the level of risk assumed for this phase of work.

The lowest inhalation ALI is for Th-230, with an allowable inhalation uptake of about 60 pCi for a dose of 50 mrem. Dust is generally controlled when it is visible, which is at approximately 5 mg/m^3. An inhalation uptake of 60 pCi over an exposure period of 200 hours would correspond to a soil concentration of about 50 pCi/g. It is unlikely that Th-230 would exist by itself, but would instead be associated with Uranium-238 decay chain members, including Ra-226, or would be present with processed thorium, which would consist predominantly of Th-232. It is therefore likely that gamma-emitters would be present in sufficient concentrations to indicate Th-230.

Observing that the Ra-226 ALI is a factor of 8 greater than that for Th-230 indicates that the corresponding soil concentration would also be a factor of 100 times greater, or 400 pCi/g to reach the inhalation dose limit.

A worker exposure of 50 mrem over 200 hours is an average of 250 µrem/hr, which would correspond to a concentration of about 350 pCi/g for the Ra-226. This would be below the action level based on allowable soil ingestion (1,500 pCi/g) and that for inhalation (5,000 pCi/g). The external dose criterion is thus the controlling level for allowable worker dose. As discussed above, this corresponds to a NaI instrument response of about 225,000 cpm, as compared to a nominal background of 10,000 cpm.

8.2 ACTION LEVELS

The limiting concentrations identified above are based on an assumed exposure period of less than 200 hour per year for the excavation workers that could result in a worker dose of 50 mrem. Survey activities at FUSRAP sites in Western New York have identified 16,000 cpm for a 2x2 NaI detector as roughly corresponding to soil investigation levels. The investigation level may be adjusted based on localized background levels. Therefore, administrative levels are established to protect workers and minimize the potential for exceeding the non-radiation worker dose limit of 100 mrem/yr.

The first administrative limit is based on reducing exposure to soil above the FUSRAP investigation limits. If soil screening measurements exceed 16,000 cpm, then workers should don full Level D PPE, and dust suppression should be used to limit levels to less than 5 mg/m3. Alternatively, the crew can implement Level C PPE in the excavation area. This level (16,000 cpm) corresponds to the FUSRAP survey investigation level and is also about 10% of the external dose rate limit.

A second administrative limit is set at 110,000 cpm, about 50% of the external dose rate limit plus background. If readings exceed 110,000 cpm, then excavation work will cease, and the area will be secured in a safe and orderly manner. The data will be reviewed with the NYSDEC and NYSDOH as appropriate. While the level of contamination suggested by such instrument readings does not pose a significant risk to workers, the concentrations of radionuclides associated with those radiation levels are not expected for the Model City site, and should be dealt with in an appropriate and planned manner.

8.3 SUMMARY

Qualified personnel will perform screening at vehicle portal monitors and radiation surveys of excavated soils at the CWM facility, in accordance with the *CWM RMU-2 Project Specific Soil Excavation Monitoring and Management Plan*. Surveys will be done using appropriately calibrated 2” x 2” sodium iodide detectors. Based on a nominal background rate of 10,000 cpm, the following action levels will be implemented:.

TABLE 8-2

SURVEY LEVEL	**ACTION**
≤16,000 cpm	Level D
>16,000 cpm, but <110,000 cpm	Level D and dust suppression to 5 mg/m3. Level C respiratory protection can be used in the excavation area in lieu of dust suppression
≥110,000 cpm	Cease operations and secure site. Review data with NYSDEC and NYSDOH as appropriate.

Note: The investigation/action level of 16,000 cpm may be adjusted based on localized background levels.

9.0 PHYSICAL HAZARDS

Physical hazards will be present during field activities. Common physical hazards include sampling, mechanical hazards, slip-trip-fall hazards associated with the field environment; hazards associated with weather conditions and musculoskeletal injury from lifting tasks. The typical physical hazards anticipated being present on the site and the methods for preventing injury to these hazards is described below.

Sampling – radiation exposure will be minimized by ensuring that personnel are experienced in the task, thus reducing their time in the area. Personnel protective equipment will be used to prevent skin contamination.

Noise – not anticipated to be a hazard on this project.

Slip-Trip-Fall Hazards - Slip-trip-fall hazards are common at field sites due to slippery or unstable surfaces, and due to the sloped surfaces on the site. While it is difficult to eliminate all slip-trip-fall hazards, implementing safe work practices, and using proper footwear will minimize risk of injury.

Lifting Hazards - Field operations often require the performance of laborious tasks. All employees must implement proper lifting procedures, such as keeping the load close to the body, and using leg muscles instead of back muscles to perform lifting tasks. Additionally, employees will not attempt to lift large, heavy, or awkwardly shaped objects without assistance.

Weather - Weather conditions are an important consideration in planning and conducting site operations. Extremely hot or cold weather can cause physical discomfort, loss of efficiency and personal injury.

Lightning may accompany storms, creating an electrocution hazard during outdoor operations. To eliminate this hazard, weather conditions will be monitored and work suspended during electrical storms.

Cold stress is not anticipated to be a concern during these operations, which are expected to take place during the summer and fall months. Heat stress is anticipated to be a concern during these operations.

Underground Utilities – No ground-penetrating activities for the gamma walkover survey are anticipated which would necessitate the location of buried utilities. In the event that utilities may be present during sampling or excavation activities, the established CWM policies and procedures for an Excavation Permit will be followed.

Overhead Hazards - Overhead power lines do not pose a danger during the task of the gamma walkover survey and associated sampling activities. CWM procedures for working near or beneath overhead lines will be followed..

Work Area Protection - Various tasks related to site survey may be undertaken in a roadway and motor vehicles may be a hazard. Personnel are to wear high visible vests and utilize orange construction cones and barriers when working in traffic areas.

10.0 BIOLOGICAL HAZARDS

Biological hazards will be present during field activities. In particular, these will be more abundant when the ground cover is thicker but in general, biological hazards may even be present when there is little ground cover. This includes but may not be limited to ticks and spiders, poisonous plants and snakes.

Be careful to wear long sleeved shirts and pants. Pant cuffs may be tucked into a boot if needed. Apply insect repellant and use caution when removing any ticks that are imbedded in skin.

Venomous snakes are best left alone. None of our species are particularly aggressive animals, but they will attempt to bite when handled. Insects (mosquitos, wasps and bees) should be avoided if noticed in areas that are to be scanned.

Ticks do not jump, crawl or fall on a person but are picked up when clothing or hair brushes a leaf or other object the tick is on. Poisonous plants should be recognized and avoided.

11.0 MONITORING EQUIPMENT

The following monitoring equipment will be used for health and safety purposes during field activities:

Meters

- Ludlum Survey Meter Model 3 (or equivalent)
- Ludlum Model 2221 (or equivalent)

Detectors

- Ludlum GM Pancake Probe Model 44-9 (or equivalent)
- Ludlum Model 44-10, 2”x2” NaI(Tl), (or equivalent)

The monitoring equipment will be calibrated in accordance with the manufacturer's instructions. In addition, the results of daily instrument calibration checks or calibrations shall be logged in the field logbook.

12.0 ACTION LEVELS

Field investigations will be initiated in Level D PPE, which includes the use of work boots, and safety glasses, hard hats, long sleeve shirts and long pants during sampling activities. As the work progresses, the Project Manager or Site H & S Specialist may elect to increase the required level of PPE to Level D with dust suppression or the addition of Level C respiratory protection, or stop work if on-site monitoring indicates that any of the action levels presented in Table 8-1 are exceeded. Respiratory protection will be used when airborne contaminants, either radioactive material or chemicals, exist at levels that require personnel protection that cannot otherwise be provided. Monitoring results that exceed the action levels will be recorded in the field log book by the Site H & S Specialist or Certified Health Physicist representative. Cotton coveralls or tyvec suits may be used for field sampling. Work gloves are not required unless physical hazards are expected (e.g., pinch hazard).

13.0 SITE CONTROL

Active areas of the site are secured by fencing and gated access. All visitors and workers will sign in and sign out at the Guard Station which is maintained by CWM Access to the area of project excavation will be limited to the project team. If a reading greater than 16,000 cpm is obtained, access will be limited to necessary personnel only. If a reading greater than 110,000 cpm is obtained, a barrier or other warning device will be established to restrict access to the project area pending further review with the Health Physicist and the agencies.

14.0 DECONTAMINATION PROCEDURES

It is not anticipated that workers will become contaminated to a level that warrants their decontamination. If workers have come into contact with soil above the action levels, they will frisk or be frisked with the GM probe using a criterion of 100 counts above background (ccpm). If contamination is on shoes an attempt to reduce radioactivity levels may consist of the use of a boot wash. If the levels persist above the 100 ccpm, the PPE will be placed into a steel drum or other container and staged in a location designated by CWM. After sampling and prior to eating, drinking, smoking, chewing, or the use of cosmetics, workers will wash their hands and face thoroughly.

If the monitoring instrument readings indicate a radiological hazard, the following steps will be followed whenever personnel leave the work area. The following may be altered by the Certified Health Physicist as conditions necessitate:

1. Don two pairs of removable gloves if not already in place.
2. Place bag over boot if contaminated.
3. Untie boot and step out of boot, while keeping it in its bag.
4. Remove outer gloves; discard in provided container
5. Remove Tyvek® or cotton coverall; discard in provided container.
6. Remove inner gloves.
7. Re-scan for contamination. Health physicist/technician to assist.
8. Wash hands and face with wet wipes or damp towels. Discard of wipes in provided container.

Deviations from this process will be noted in the field logbook. All spent decontamination fluids (rinse waters, etc.) shall be handled as directed by the Field Manager and in accordance with relevant regulations.

15.0 PERSONNEL PROTECTIVE EQUIPMENT

Typical Personnel Protective Equipment to be utilized by field personnel during the survey and sampling activities include the following:

- ANSI-Approved Safety glasses with side shields (or goggles) for sampling
- ANSI-Approved Hard hat when overhead hazards are present
- Ordinary coveralls (e.g., cotton) (Tyvek® may be substituted)
- Ordinary work gloves (e.g., leather) when pinch hazards are likely
- Hiking boot with ankle support or ANSI-Approved Steel-toe, steel-shank work shoes or boots with ankle support. Soles should be appropriate for field conditions with sloped hills.

In the event that site conditions change, or specified radiological or chemical contamination action levels are approached, the Site Safety Specialist or Health Physicist may increase the PPE level to C or higher if necessary.

16.0 HAZARD COMMUNICATION

Chemicals will not be required for site work; therefore, Material Safety Data Sheets (MSDSs) will not have to be provided. Requirements for an initial safety meeting and daily safety meetings ("tailgate" meetings) are presented in the Accident Prevention Plan (Attachment C) and Activity Hazard Analysis (Attachment D).

17.0 SUBSTANCE ABUSE POLICY

Contractor/Vendor shall disseminate to its employees, agents and subcontractors the following text of the CWM Chemical Services, LLC. Substance Abuse Policy as follows and require such persons and their employees to abide by the terms of such policy:

CWM Chemical Services, LLC, is vitally concerned with the safety and well-being of the employees of its contractors. Therefore, it is important for you to be aware of CWM's policy regarding alcoholic beverages and controlled substances:

The use, possession, sale, transfer, or purchase of alcoholic beverages and controlled substances on the work site is prohibited.

"The work site" means any property or facility under the control of CWM wherever located, including land, buildings, structures, installations, cars and trucks.

"Controlled substances" means any drug or other ingestible, inhalable, or injectable substance for the use, sale, or possession of which is prohibited or restricted by law except drugs prescribed for the user by a licensed physician.

"Use" means ingesting, inhaling, or injecting alcoholic beverages or controlled substances either during the time an individual is present on the work site or within such time prior to entering upon or returning to that his or her coordination, visual perception, or reaction time is, or is likely to be, affected by such beverage or substance.

Entry into the work site constitutes consent to inspection of the individual's person and his or her personal effects upon entering or while remaining present on the work site. Any Individual who is found in violation of this Substance Abuse Policy or who refuses to permit inspection is subject to be removed and barred from the work site at the discretion of CWM.

REFERENCES

MARSSIM, 2000. *Multi-Agency Radiation Survey and Site Investigation Manual*, EPA 402-R-97-016, USEPA, August 2000

CWM Chemical Services, LLC, Model City, New York 14107, Safety Procedures and Requirements for Outside Contractors

CWM Chemical Services, LLC, Model City, New York 14107, Major Emergency Evacuation and Response Procedures

CWM Chemical Services, LLC, Model City, New York 14107, Standard Division Practices

CWM Chemical Services, LLC, Model City, New York 14107, Health & Safety Manual

Golder Associates, CWM RCRA Facility Investigation Summary Report, 1993

URS Corporation, Gamma Walkover Survey Site Safety and Health Plan for CWM Chemical Services, LLC. and Addendum, August 2005

Shaw Environmental Services, Site Wide Radiological Investigation Plan, April 2005

Shaw Environmental Services and CWM Chemical Services, LLC, Site Wide Radiological Investigation Plan, September 2005

CWM Chemical Services, LLC, Model City, New York 14107, Contingency Plan

ATTACHMENT A

CWM MAJOR EMERGENCY EVACUATION AND RESPONSE PROCEDURE

Major Emergency Evacuation and Response Procedure

The primary purpose of this procedure is the accurate accounting of every person within the CWM Chemical Services, LLC. Model City facility.

In the event of an emergency, the Emergency Sirens will be sounded for two (2) minutes. When the sirens are activated, the following procedures shall be in effect:

1. Emergency Response Team Personnel will report to the Response Unit Garage (Team members should, if possible, notify their Supervisor, that they are reporting to the Response Unit Garage).

2. Department Supervision will be on an alert status. Supervisors will determine the location of their personnel and be prepared to account for them.

3. All other Facility Personnel will remain at their work location unless they are within the immediate danger area.

4. All vehicular traffic will pull as far to the right side of the road as possible and stop until directed otherwise. This includes facility equipment, Contractors, Drivers and Visitors.

5. EMERGENCY VEHICLES HAVE THE RIGHT-OF-WAY AT ALL TIMES.

6. Facility personnel will keep roads clear of any equipment and have the authority to direct non-plant personnel to stop and/or clear the road.

7. During an emergency, facility telephones and plant radios are restricted to emergency communications only.

IN THE EVENT THE POSSIBILITY OF EVACUATION BECOMES NECESSARY, THE EMERGENCY SIRENS/ALARMS WILL BE SOUNDED FOR A SECOND TWO (2) MINUTE INTERVAL. WHEN THE SIRENS ARE ACTIVATED FOR THE SECOND TIME, THE FOLLOWING PROCEDURE WILL BE IN EFFECT:

1. Everyone not engaged in the emergency response MUST report to:

Primary Facility Site	Scalehouse / Roll off Garage
Alternate Locations	Plant Main Entrance Gate (1550 Balmer Road) SPEC (Admin) Building SPEC Building East Parking Lot

2. Guard will fax to scale house all on-site contractors and drivers list. Guard will also transmit current list of all CWM Personnel to Scalehouse. Scales individual will obtain lists and assist CWM designee who is responsible for the site head count.

3. Operations Manager and Department Supervisors not involved in response – are responsible for recording all persons reporting to the site primary or secondary reporting location (Current employee and contractor list will be available at the Scalehouse/Roll-off Garage).

4. CWM employees will line up inside the Roll-off Garage. Contractors will gather at the west side of the Roll-off garage.

5. Department Supervisors are responsible for an accurate account of individuals from their respective Department.

6. Supervisors are responsible for checking and clearing their work areas of Contractors, Visitors, Truck Drivers, etc.
7. The Emergency Coordinator or designee is responsible for coordinating Search and Rescue Operations for unaccounted individuals.

8. <u>No CWM or private vehicle will obstruct emergency response equipment or emergency operations</u>.

9. All personnel will remain at the Primary or Secondary Reporting Location until directed to leave by the Emergency Coordinator.

10. <u>No one</u> will exit the facility without giving notice to the Emergency Coordinator or designee.

Department supervision shall have a prearranged plan established for SECURING vital records and/or process shut-down procedures.

CONTRACTORS

In addition to following the Evacuation Plan, Contractors may be requested by the Emergency Coordinator to assist with heavy equipment.

LANDFILL SUPERVISION

When the second siren alarm is sounded, Supervision will shut down all landfill operations immediately. No one will remain in the landfill, i.e., truck drivers who may wish to continue unloading. All individuals, including truck drivers, will be directed or provided with transportation to the Primary or Secondary Site Reporting Location.

TRUCK DRIVERS/BROKERS

Truck Drivers/Brokers who are in the process of unloading trucks when the second siren alarm is sounded will immediately shut off their truck engine, secure records and report to the Primary or Secondary Site reporting Location for further directions.

GUARD HOUSE

The Security Guard will **NOT ALLOW ANYONE** to enter the facility during a major emergency except Emergency Equipment/Personnel, and CWM Supervision. NYSDEC and USEPA Representatives will only be admitted upon approval of the Emergency Coordinator or Engineering and Environmental Manager or Health & Safety Manager or General Manager.

ADMINISTRATION BUILDING AND ENVIRONMENTAL MONITORING PERSONNEL

Personnel in the SPEC Center (Administration Building) and environmental monitoring personnel will evacuate to the Spec Center East Parking lot. The Environmental Compliance Specialist or Designee is responsible for recording all personnel who report to the SPEC Center Parking Lot. This individual will notify the Emergency Coordinator by radio the status of the personnel recording list. The list of SPEC Center current employees utilized for head count purposes will be posted in the SPEC Center Mail Room.

COMMUNICATIONS

The SPEC Center telephone person will maintain open outside telephone lines for emergency use. Two way radio communications will be established as quickly as possible from the response incident site to the Emergency Coordinator & Operation Center.

TESTING

Testing of the siren(s) for operation will normally be conducted at 12:00 noon every Wednesday of each month. No response by any personnel is needed.

ATTACHMENT B

CONTAMINATION CONTROL PROGRAM (HS-1144) & PERSONAL PROTECTIVE EQUIPMENT (HS-1161) AND ACTIVITY HAZARD ANALYSIS

1.0 PURPOSE:

1.1 This program describes the contamination control procedures within the CWM Model City Facility. The intent of the program is to minimize and control the spread of contamination within the facility, and to prevent accidental chemical contact to employees and visitors of the facility.

2.0 SCOPE

2.1 This procedure applies to CWM Chemical Services, Inc. employees that enter work areas where the potential for contact with hazardous substances exist.

3.0 RESPONSIBILITY

3.1 CWM Health & Safety Manager is responsible for overall administration of the Contamination Control Program.

3.2 CWM Health & Safety Manager is responsible to insure employees are trained and understand all conditions of this program.

3.3 CWM Operations Manager is responsible for insuring that employees understand the necessity of complying with this program.

3.4 All employees have the responsibility to adhere to all conditions stated in this program

4.0 DOCUMENTATION/FORMS

4.1 Attachment #1, List of Standard Division Practices affecting contamination control.

4.2 Attachment #2, Personal Protective Equipment Debris and Contaminated Equipment Disposal.

5.0 DEFINITIONS OF CONTAMINATION CONTROL AREAS

5.1	Clean Area	Chemical contamination is not expected to be present.
5.2	Controlled area	Chemical contamination may be present due to residual contamination from past spills, leaks, or from contact with contaminated equipment or shoes. Processes within the controlled areas are enclosed or controlled to minimize employee exposure and spillage.
5.3	Exclusion area	Chemical contamination is likely to be present due to the nature of the operation(s) within the area.
5.4	Transition area	Area where personnel leaving an exclusion area remove potentially contaminated clothing or decontaminate their protective equipment.

6.0. CONTAMINATION CONTROL AREAS

6.1	Clean areas	Administrative offices, lunchroom, heavy equipment and facility maintenance shops, plant entrance thoroughfares.
6.2	Controlled areas	Drum Handling Building; Aqueous Treatment Building; Truck Wash; Fuels Area; PCB Warehouse, Oil/Water Separator - SLF 1-6 and SLF 12; Tank Containment - Tanks 101-103.
6.3	Exclusion areas	Stabilization Facility; T/O Building; SLF's 1-6, 7, 10, 11, 12; RMU-1; Salts Area - North, East, West; Aqueous Treatment; Lagoons - 1, 2, 5, 6, 7; excavation in Process Area + other areas identified as > 1 ppm VOAs in RFI
6.4	Transition areas	Access areas to exclusion areas; Stabilization Facility; T/O Building; SLF's 1-6, 7, 10, 11, 12; Salts Areas - North, East, West; Aqueous Treatment; Lagoons - 1, 2, 5, 6, 7

7.0 PROCEDURES GOVERNING CONTAMINATION CONTROL AREAS

7.1 Clean areas

7.1.1 All forms of protective equipment with the exception of hard hats, safety glasses, and safety shoes are prohibited from clean areas.

7.1.2 Process or waste samples are prohibited from being stored or handled in clean areas.

7.2 Controlled areas

7.2.1 Controlled areas are delineated by signs at building or operations entrance locations which:

1) specify personal protective equipment requirements.
2) specify that entrance is limited to authorized personnel only.

7.2.2 Safety glasses, hard hat, and safety shoes shall be worn by all individuals entering the controlled areas. Additional protective equipment may be required in controlled areas as defined in the CWM Chemical Services Health & Safety Program: MDC HS-1161, "Personal Protective Equipment".

7.2.3 Disposable protective equipment used for specific operations within the controlled areas shall be disposed of in designated receptacles before entering clean areas of the facility. Receptacles are located at entrance/exit locations of the Stabilization Facility; Drum Handling Building; Aqueous Treatment Building; Truck Wash; Fuels area; PCB Warehouse and RMU-1.

7.2.4 Reusable protective equipment shall be decontaminated after use and stored in designated locations. Reusable Personal Protective Equipment items that may require decontamination include hard hats, safety glasses, respirators, gloves and boots.

A cloth or brush shall be used to remove surface contamination. Cleaning is considered complete when visible signs of contamination are removed.

7.0 PROCEDURES GOVERNING CONTAMINATION CONTROL AREAS (cont):

Respirator cleaning shall be accomplished as specified in the CWM Chemical Services Health & Safety Program, #38 Respiratory Protection.

PCB contaminated articles shall be cleaned with an organic solvent such as kerosene.

Decontamination of highly contaminated articles or articles contaminated with extremely toxic materials shall be performed as prescribed by the CWM Health and Safety Manager or Laboratory Manager on a case-by-case basis.

7.2.5 All equipment in the controlled areas shall be decontaminated prior to removal for maintenance activities or before maintenance activities are performed on the equipment in the controlled areas. This equipment includes but is not limited to pipes, pumps, tanks, filters and hoses.

7.3 Materials from the controlled areas of the plant shall be discarded by placing the items in designated site containers destined for proper disposal.

7.4 Employees and visitors leaving the controlled areas should wash their hands and face before engaging in other activities.

7.5 Employees and visitors leaving the controlled areas shall remove loosely bound contaminated material from their shoes or boots before entering the clean area. Shoe/boot cleaning stations are located in the Aqueous Treatment Building; Stabilization Facility and RMU-1 entrance/exit area.

8.0 EXCLUSION AREAS

8.1 Safety glasses, eye protection and safety shoes are the minimum protective equipment required in the exclusion areas. Additional protective equipment may be required in the exclusion areas as defined in the CWM Chemical Services Health & Safety Program, MDC HS-1161 "Personal Protective Equipment".

8.2 Disposable PPE worn in the exclusion areas shall be removed and placed in the proper receptacle in the transition area before entering the clean areas of the plant. Refer to Attachment 2 Flow Sheet.

8.3 Reusable protective equipment shall be decontaminated after use and stored in designated locations.

Reusable Personal Protective Equipment items that may require decontamination include hard hats, safety glass, respirators, gloves and boots.

A cloth or brush will be used to remove surface contamination. Cleaning is considered complete when visible signs of contamination are removed.

Respirator cleaning will be accomplished as specified in the CWM Chemical Services Health & Safety Program, MDC HS-1162 "Respiratory Protection".

PCB contaminated articles shall be cleaned with an organic solvent such as kerosene.

9.0 WORK PRACTICES TO MINIMIZE OR ELIMINATE POTENTIAL EXPOSURE TO HAZARDOUS MATERIALS

9.1 Division Standard Operating Procedure include work practices to minimize or eliminate potential exposure to hazardous materials. Refer to Attachment #1.

10.0 PROCEDURES TO ASSURE VISITORS AND CONTRACTORS ARE ADEQUATELY PROTECTED FROM POTENTIAL CONTAMINATION

10.1 CWM Health and Safety Procedure MDC HS-1105, "Visitor Safety Program"; and MDC HS-1105.1, "Contractor Safety Procedure", address procedures to assure visitors and contractors are adequately protected from potential contamination.

11.0 PROCEDURE TO HANDLE CONTAMINATED PERSONNEL OR EQUIPMENT DURING EMERGENCIES

11.1 Decontamination is required for all personnel that enter an emergency contaminated zone. All personnel exiting the contaminated zone must decontaminate at the perimeter of that zone, in order to minimize the exposure of uncontaminated employees.

11.2 Decontamination shall be accomplished by removing or decontaminating all personal protective equipment that could have come in contact with a potential contaminated material. The PPE must be discarded or decontaminated using the decontamination protocol specified in this procedure and the Division's Contingency Plan.

12.0 CLEANING AND DECONTAMINATION OF VEHICLES PRIOR TO PERFORMANCE OF MAINTENANCE, ANNUAL TESTING, OR REMOVAL FROM ACTIVE AREAS

12.1 Standard Division Practice #2021, addresses cleaning and decontamination of vehicles exiting the landfill.

13.0 MISCELLANEOUS PROCEDURES

13.1 Spills in the facility will be cleaned up as quickly as possible according to the procedures described in the CWM Chemical Services Facility's Contingency Plan; Spill Prevention, Control and Counter Measures Plan and PCB Spill Cleanup Policy.

13.2 Leaks and spills shall be reported to the supervisor on duty as soon as possible after they are discovered.

13.3 All company supplied clothing worn in the controlled areas of the facility shall be removed before leaving the premises and placed in the "dirty" clothes receptacle located in the Employee Locker Room.

13.4 For personnel assigned a locker in the Employee Locker Room, safety shoes shall be removed before leaving the premises and stored in the employees "dirty" locker section of the Employee Locker Room.

13.5 Reusable protective equipment shall be frequently inspected. It shall be discarded if the contamination is likely to cause employee skin contact with the contaminants or if the integrity of the protective equipment appears to be compromised.

14.0 LOCKER ROOM FACILITIES

14.1 The locker room is divided into two (2) basic sections, a clean and dirty area. Lockers are provided in each section for individual storage of street clothes (clean section) or work clothes (dirty section). Employees will park their personal vehicle in the north parking lot and enter the locker room through the north entrance door.

14.2 Individuals will proceed to the locker room clean section where they will store their street clothes in assigned lockers, then progress to the locker room dirty section where again each employee is assigned a locker for the change into work uniforms. Individuals will exit through the south exit door and be transported by company vehicle to the site operations. When returning to the locker room from the site, entrance will be through the south entrance door into the dirty locker room section.

14.3 Showers are located in the dirty section. Only toiletry items are allowed in the shower room drying area. Soiled work uniforms should be placed in hampers located in soiled laundry room area. Clean uniforms are available from linen lockers located in the main laundry room.

14.4 Contaminated Personal Protective Equipment, i.e, coveralls, boots, etc. MUST be disposed of in the appropriate work area. NO CONTAMINATED PPE WILL BE TAKEN INTO THE LOCKER ROOM. A boot wash is located inside the south entrance door to the dirty section. Soiled boots must be cleaned before transporting them in the locker room area. Eating is prohibited in ALL areas of the locker room and smoking is permitted only in the clean section of the locker room.

15.0 POTENTIAL FOR SPILLS

15.1 There are several operations within the facility which have the potential for spills if not performed properly. The CWM Chemical Services Standard Division Practices for these operations follows; refer to Attachment #1.

16.0 FUGITIVE DUST CONTROL PLAN

16.1 Fugitive dust control shall be accomplished as specified in the Site Wide NYSDEC Permit #373, Section "J".

ATTACHMENT #1

STANDARD DIVISION PROCEDURES	NUMBER
Sampling of Solids and Semi-solids in Drums and Pails	2001
Sampling of Liquids and Sludges in Drums and Pails	2002
Sampling Tankers	2003
Sampling of Bulk Solids and Semi-Solids	2004
Sampling Liquid Fuel Tanks	2005
Sampling Aqueous Tanks	2006
Bulk Liquid Tank Truck Unloading	2019
Cleaning and Decontamination of Vehicles Exiting Landfill	2021
Taking Fuel Tank Level Measurements	2034
Transformer Handling	2044
Transformer Draining and Flushing	2045
Disposal and Stabilization of DuPont Sodium Waste	2046
Measuring Landfill Leachate Levels	2055
Monitoring Caustic Levels and Concentrations in the Aqueous Treatment Scrubber	2061
Removal of Accumulated Rainwater From Containment Areas	2063
Leachate Collection Pit Transfer	2064
Operation of the SLF-12 Oil/Water Separator System	2067
Operation of the Mechanized Stabilization Process Train	2068
Stabilization Using Backhoe and Roll-off Box	2069
Cleaning of the Mechanized Stabilization Process Train	2078
Stabilization of PCB Wastes	2079
PLC Decant of Fuels Materials	2080
Stabilization of Wastes in Dump Trucks and Trailers	2081
PLC Decant of Aqueous Materials	2082
Landfill Disposal of Asbestos Material	2083
Stabilization of Asbestos Wastes	2085
Sampling of Stabilized Residuals	2092
Tank to Tank Product Transfer	2110
Bulk Tank Truck Loading	2111

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MODEL CITY's SDP's

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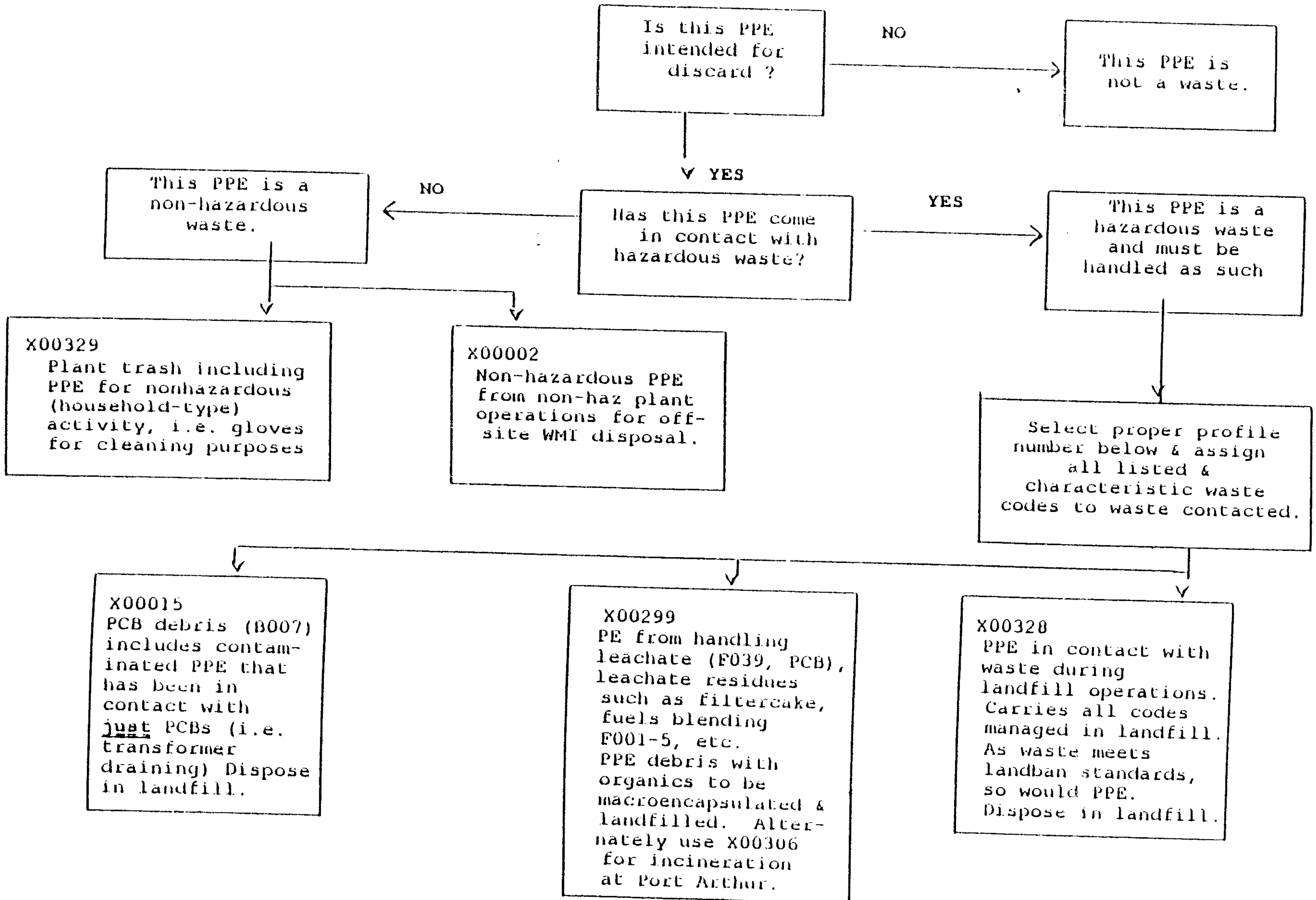
PPE[1] Characterization and Disposal



[1] includes all types of equipment including tyveks, respirator cartridges, gloves, etc..

ppedisp4.flw

Updated: 08/18/95

MODEL CITY FACILITY	Title: Personal Protective Equipment	Date: Apr 1997 Page: 1 of 11
		Revision Date: April 2005
	MDC HS-1161	Supersedes: Aug 1999
Health and Safety Program	Approval:	Title: District Manager

1.0 PURPOSE

This procedure defines the minimum CWM Chemical Services, L.L.C. requirements and responsibilities for the implementation of CWM personal protective equipment programs designed to protect employees from hazards during the performance of work activities.

2.0 SCOPE

This practice describes the minimum PPE that must be donned prior to entering specific work areas at the CWM Chemical Services, L.L.C., Model City, NY facility. It also includes the minimum PPE required to perform various jobs or tasks. Depending upon the hazard and/or the job, it may be necessary to don additional PPE. Personnel will be informed of additional PPE requirements through Material Safety Data Sheets (MSDSs), Waste Profile Sheets, Standard Division Practices and work area supervisors.

3.0 PROGRAM RESPONSIBILITIES

3.1 Safety Specialist is the personal protective equipment administrator and has the responsibility to:

3.1.1 Coordinate the program.

3.1.2 Ensure that annual training is conducted in accordance with Section 8 of this Program.

3.1.3 Review the program annually.

3.1.4 Safety Specialist is responsible for maintaining the site PPE inventory control program.

3.1.5 Safety Specialist is responsible for the purchase of PPE, including respiratory protection.

3.2 Supervisors are responsible for informing workers of the personal protective equipment requirements within their department/area. The supervisor will also ensure that workers have been instructed in the proper donning, wearing, removal and the cleaning or disposal procedures for such equipment, and that the worker has understood the instructions. The supervisor will provide additional instructions, as needed.

3.3 Supervisors are responsible for ensuring employees have no facial hair which will interfere with a proper respirator face seal.

3.4 Workers are responsible for properly donning, wearing, removing, cleaning, and disposing of the required protective equipment.

3.5 Project Engineers/Contact Person are responsible for ensuring that contractors provide their own protective equipment as specified in the Division's "Contractor Safety Procedure", MDC HS-1105.1 and wear protective equipment as specified in this Program.

4.0 GENERAL REQUIREMENTS

Personal Protective Equipment (PPE) refers to the broad category of safety equipment into which is placed virtually any wearable item designed to protect the worker. Subcategories of PPE would include, but are not limited to: chemical protective clothing, respiratory protection, head and eye protection, hearing protection, and special hazards equipment such as life-lines and harnesses, cooling vests, hot work clothing, and others. The requirements for CWM's "Respiratory Protection Program", are described in Health and Safety Program procedure under MDC HS-1162. Selection and use requirements for hearing protectors are described in Health and Safety Program Procedure under MDC HS-1123, "Hearing Conservation". Guidelines for the selection and use of chemical protective clothing are provided in "Guidelines for the Selection of Chemical Protective Clothing" published by the American Conference of Governmental Industrial Hygienists (ACGIH).

4.1 CWM employees shall only use personal protective equipment supplied by the company.

4.2 Visitors will be supplied with the following personal protective equipment as outlined in the Division's Health & Safety Program, "Visitor and Contractor Safety", MDC HS-1105.

4.3 Disposal of PPE and cleaning of reusable PPE is governed by the procedures specified in the Division's Health & Safety Programs for "Respiratory Protection Program", MDC HS-1162, and "Contamination Control Program", MDC HS-1144. Disposal of PPE should be in accordance to SDP 3001 Site Generated Waste.

4.4 Written procedures governing the safe use of PPE that might be required in an emergency are contained in the division's Health & Safety Program, "Guidelines & Procedures for Hazardous Material Emergencies", MDC HS-1181.1, CONTINGENCY PLAN. SPCC PLAN, SPILL ABATEMENT, etc.

5.0 GENERAL CLOTHING (WORK UNIFORM)

5.1 Shorts are prohibited and employees must wear clothing which covers the upper portion of the body and arms.

5.2 Long-sleeved shirts and long pants, are required for employees working on the active areas of the facility and in the Maintenance and Heavy Equipment shops.

5.3 Long sleeved shirts may be turned up to just below the elbow when doing so either: does not jeopardize the protection of the employee (e.g. driving through the active areas of the facility), provides the employee greater protection (e.g. when the sleeves of the uniform may interfere with the task being performed) or when employee protection is provided through another means (e.g. tyvek coverall sleeves extend well into employees gloves).

6.0 EYE AND FACE PROTECTION

The following shall be used to assist in the selection of eye and face protection:

6.1 Selection of eye and face protection will conform to ANSI Standard, Z87.I-I989 and OSHA 29 CFR I910.I33.

6.0 EYE AND FACE PROTECTION

6.2 Minimum eye protection consists of spectacles with industrial safety lenses and half side shields. In addition, suitable eye and face protectors will be provided as specified in the Task/Area PPE Requirement Sheets.

6.3 Eye protection (safety glasses with side shields) are required to be worn at all times while on the site other than in offices, the SPEC center (including parking lot), break and lunch rooms, entering and leaving employee's work station (including from a vehicle to an office), at the beginning and end of shift, etc.

6.4 Prescription safety glasses with side shields shall be provided to employees requiring corrective lenses.

6.5 Eye Protection for contact lens wearers shall be selected using the same criteria as for individuals not wearing contact lenses to ensure protection against the anticipated hazard (e.g. eye protection for handling of liquids posing a chemical splash hazard must include splash goggles, full-face shield or full-face respirator). Contact lenses may be worn when wearing a full-face respirator. Personnel shall not be allowed to wear contact lenses in dusty environments (e.g., landfills, stabilization buildings).

6.7 Face shields do not provide adequate eye protection and shall not be worn as a substitute for full face piece respirators.

The use of a full face piece air purifying full face piece supplied air respirator or a half face piece air purifying with chemical goggles shall be worn when chemical liquid splashing may occur.

7.0 PROTECTIVE HEADWEAR

7.1 All head protection (hard hats) will comply with ANSI Standard Z89.I-I997 and OSHA Standard 29 CFR Part I9I0.I35

7.2 Hard hats are required to be worn in all areas of operations.

7.3 Hard hats are not required to be worn while inside vans, pick up trucks, automobiles, and buses at any time, or while operating heavy equipment, tractors, fork lifts, etc equipped with rollover protection.

7.4 Hard hats are required to be worn at all times while on the site other than in offices, the SPEC Center (including parking lot), break and lunch rooms, entering and leaving employee's work station (including from a vehicle to an office), at the beginning and end of shift, etc.

8.0 PROTECTIVE FOOTWEAR

8.1 Selection of foot protection will conform with ANSI Standard Z4I.I991, which has been adopted by reference in OSHA 29 CFR I9I0.I36. If purchased prior to July 5, 1994 it will conform to ANSI Standard Z41.1-1967.

8.2 Safety shoes (steel toe cap - 6" upper) are required for employees working on active work areas of the facility and in the Maintenance and Heavy Equipment shops.

9.0 HIGH VISIBILITY VEST

9.1 All employees working in or near motor vehicle traffic must wear a high visibility vest per ANSI Standard ISEA 107-1999 Conspicuity Class 2 High Visibility Safety Apparel.

10.0 TRAINING

Training on the contents of this program shall be conducted annually and shall include the following:

10.1 Proper selection, use and maintenance of the equipment, including capabilities and limitations.

10.2 The nature of potential hazards and the consequences of not using the appropriate equipment.

10.3 Procedures for inspecting, donning, doffing, checking, and fitting equipment.

10.4 Emergency procedures in the event of equipment failure.

10.5 A review of the area and task specific protective equipment requirements of Appendix G of this procedure.

11.0 PROCEDURES

NOTE: It must be understood that this practice describes the minimum PPE requirements for entering a contaminated area or performing a specific job. Minimum PPE requirements are based on data collected through the industrial hygiene air sampling program, hazard evaluation, incident investigation, job safety analysis, observation and experience. However, not all hazards can be anticipated and occasionally different or additional PPE may be required depending upon the circumstances. Therefore, it is equally important that employees learn to identify and evaluate hazards to ensure that the proper PPE is selected.

11.1 Identify and evaluate hazards encountered on the job.

11.1.1 Determine the physical hazards.

11.1.1.1 Consider sharp or falling objects.

11.1.1.2 Consider overhead obstructions.

11.1.1.3 Consider slippery surfaces.

11.1.1.4 Consider heat or cold.

11.1.1.5 Consider flying particles.

11.1.1.6 Consider pinch points.

11.1.2 Determine the health hazards.

11.1.2.1 Consider splashes or vapors from corrosive or toxic substances.

11.1.2.2 Consider harmful dusts, fogs, fumes, mists, gases, smokes and sprays.

11.1.3 Review hazard information sources.

11.0 PROCEDURES (cont):

11.1.3.1 Consider Material Safety Data Sheets (MSDSs), Warning Labels and Signs, Profile Records Hazardous Waste Manifests, Treatment and Disposal Slips, Work Permits, Lab Approval Notifications, Special Waste Analysis Reports (SWARs), and Standard Division Practices (SDPs).

11.1.4 Utilize test and/or sampling equipment (i.e., Noise Level Meter, LEL/0_2 Meter, Drager Tubes, Air Sampling Pumps, etc.) to evaluate hazards like noise, flammable gases, atmospheres that are Immediately Dangerous to Life and Health (IDLH) and exposure to contaminants at levels above the established Time Weighted Average - Threshold Limit Value (TWA-TLV).

NOTE: Employees must be trained and qualified prior to operating test equipment.

11.2 Once the hazard identification and evaluation process is completed, match the PPE to the hazard.

11.2.1 Refer to "Criteria for the Selection of PPE" at Exhibit #1.

11.2..2 Refer to "Gloves Selection" at Exhibit #2.

11.2.3 Refer to "Selection Chart for Eye and Face Protectors" at Exhibit #3.

11.2.4 Refer to "Respirator Selection Flow Chart" at Exhibit #4.

11.2.5 Refer to "Cartridge Selection Guide" at Exhibit #5.

11.3 Select PPE that will provide adequate protection against hazards faced on the job.

11.3.1 Determine area or job specific PPE requirements.

11.3.1.1 Refer to "PPE Certification of Hazard Assessment and Equipment Selection", Exhibit #6.

CAUTION: The PPE Certification of Hazard Assessment and Equipment Selection Sheets does not cover all the hazards that an employee may face during job performance. Employees must remain alert for any new hazard(s) and take appropriate action to protect themselves.

11.3.1.2 Prior to handling any hazardous chemicals, read the MSDS.

NOTE: Pay particular attention to those sections on the MSDS that address PPE. MSDSs are available in department computers.

11.3.1.3 Prior to handling hazardous waste, review the Waste Profile Record for information concerning PPE.

11.3.1.4 Read PPE requirements on work permits.

11.0 PROCEDURES (cont):

11.3.1.5 Prior to job performance, study written procedure (i.e., SDP, SOP, etc.).

NOTE: All personnel not assigned to a specific operating or maintenance area shall consult with the area supervisor before entering the area so they can be briefed on any additional hazards and PPE requirements that may exist.

11.3.2 Determine the level of protection needed to enter the work areas.

11.3.2.1 If you enter an immediate work area without the proper PPE, promptly leave the area where the work is being performed or don the PPE required for that work.

11.3.2.2 Refer to "PPE Certification of Hazard Assessment and Equipment Selection" in Exhibit #6 for job specific requirements.

11.3.3 Recognize and distinguish between areas where PPE is required and areas where PPE is not required.

11.3.4 Warn any individual not wearing the required PPE.

NOTE: Every CWM employee has the responsibility of warning any individual not wearing the required PPE in a specific area or while performing a specific task.

NOTE: High heels, sandals, tennis shoes, tank tops, sleeveless shirts, short pants or dresses are prohibited in operating areas.

NOTE: Site tour personnel (i.e., guide, visitors, etc.) are exempt from the no dress/no high heel rule, as long as they remain in the site tour bus or are walking from the bus to the training room for orientation.

11.4 Test and inspect PPE prior to use.

11.4.1 Ensure that a qualitative fit test is completed each time you are issued a new respirator and/or yearly. (Refer to Health & Safety Procedure, MDC HS-1162, "Respiratory Protection Program").

11.4.2 Ensure that the correct filters are installed on air purifying respirators.

11.4.2.1 Match the chemical cartridge to the hazard.

11.4.2.2 Read the chemical cartridge label.

NOTE: The label will describe the chemical(s) that the cartridge will protect against.

11.4.2.3 Refer to the "Cartridge Selection Guide" at Exhibit #5.

11.4.2.4 If you are not sure what filter to use, ask your supervisor.

11.0 PROCEDURES (cont):

11.4.3 Inspect air purifying respirators.

11.4.3.1 Check rubber face piece for dirt, pliability of rubber, deterioration, cracks, tears and holes.

11.4.3.2 Check straps for breaks, tears, loss of elasticity, broken attachments or snaps and proper tightness.

11.4.3.3 Check exhalation and inhalation valves for holes, warpage, cracks and dirt.

11.4.4 Check all PPE for tears, leaks, punctures, or signs of wear.

NOTE: Tearing tyvek or poly tyvek suits for any reason, other than removal, is prohibited.

11.4.5 Ensure that non-disposable PPE is not contaminated from it's last use.

11.4.5.1 Refer to Health & Safety Program, MDC HS-1144, "Contamination Control".

11.4.6 Check safety glasses, goggles, face shields, or full face respirator lens for obstructed vision (i.e., nicks, scratches, stains, dirt, etc.).

11.5 Don PPE correctly.

11.5.1 Always make sure that everything fits.

WARNING: Loose clothing can get caught in machines.

11.5.2 Ensure that all buttons and snaps are fastened.

11.5.3 Ensure that all straps are secure.

11.5.4 Ensure that all zippers are up.

11.5.5 If necessary, use tape to seal zippers or secure cuffs and pants.

11.5.6 Ensure that there is an air tight seal between your face and the respirator.

CAUTION: Facial hair (i.e., all beards, beard stubble, side burns, long mustaches, etc.) will prevent adequate face seal. Male employees must shave daily to ensure proper seal.

11.5.6.1 Prior to each use, conduct a field fit (positive/negative) test on all air-purifying respirators. (Refer to Health & Safety Procedure, MDC HS-1162, "Respirator Protection Program".)

11.6 Remove PPE correctly.

11.6.1 Decontaminate non-disposal PPE clothing (i.e., slicker suit, acid suit, rubber boots, etc.) prior to removal.

11.0 PROCEDURES (cont):

11.6.1.1 Refer to Health & Safety Program, MDC HS-1144, "Contamination Control".

11.6.2 Remove disposable PPE carefully so as not to contaminate yourself.

11.6.2.1 Remove outer gloves first.

11.6.2.2 Leave inner gloves on when removing contaminated PPE.

NOTE: The ideal way to remove contaminated PPE is to take off items on the upper body first and then work down. Inner gloves should be the last item removed.

CAUTION: Be careful and try not to contaminate your bare hand when taking off inner gloves. Grasp inner glove at wrist and peel off.

11.6.3 Place disposable PPE in proper container.

11.6.4 Clean and inspect your respirator.

11.6.5 Store all non-disposable PPE in designated location.

11.7 Maintain non-disposable PPE.

NOTE: PPE is provided by the Division as a line of defense against potential hazards that exist at our facility. To afford maximum protection, the PPE must be properly maintained. Respirators must be cleaned after each day's use or more often, if necessary. When not in use, respirators must be stored in appropriate storage.

11.7.1 Clean and disinfect PPE regularly.

11.7.2 Inspect PPE before and after each use.

11.7.3 Replace any punctured, leaking, torn, worn or damaged PPE and/or accessories.

11.7.4 Replace safety glasses, goggles, or face shields if vision is obstructed.

11.7.5 Replace respirator dust filters and chemical cartridges daily or more often if wearer detects odor, taste, irritation or plugging.

11.7.6 Store PPE in designated location.

11.8 Recognize and understand PPE limitations.

11.8.1 If available, read instructions provided by the manufacturer.

NOTE: Instructions usually accompany new equipment.

11.8.2 Use boot covers to protect leather footwear from contamination.

CAUTION: Leather absorbs and cannot be decontaminated.
CAUTION: Boot covers may be slippery on wet or dusty surfaces.

11.0 PROCEDURES (cont):

11.8.3 Do not wear shaded safety glasses during night time or indoor operation.

CAUTION: Shaded safety glasses reduce vision at night and are prohibited on evening shifts, or indoor activities.

11.8.4 Do not use air purifying respirators in oxygen deficient atmospheres.

WARNING: Never use air purifying respirators in oxygen deficient atmospheres (less than 19.5% oxygen) or atmospheres immediately dangerous to life and health (IDLH).

11.8.5 Use air purifying respirators around chemicals with adequate warning properties (i.e., offensive odor, irritant, etc.).

11.8.6 Use supplied air respirators around chemicals with little or no warning properties.

11.8.7 Determine the degree of protection afforded by a respirator.

11.8.7.1 Refer to "Respirator Protection Factors" at Exhibit #10.

11.8.8 Replace chemical cartridges often enough to prevent break-through.

11.8.8.1 Refer to Health & Safety Procedure, MDC HS-1162, "Respiratory Protection Program".

NOTE: Break-through occurs when the sorbent material and filter pads in the cartridge are no longer effective due to excessive contaminants.

CAUTION: High humidity can reduce chemical cartridge effectiveness.

12.0 EVALUATION OF PPE PROGRAM

The Division shall annually evaluate its PPE program to ensue its effectiveness and that it meets all regulatory and company requirements. Exhibit #7.

USER RESPONSIBILITIES

12.1 Identifies and evaluates hazards encountered on the job.

12.2 Determines what the physical and health hazards are.

12.3 Reviews hazard information sources.

12.4 Matches the PPE to the hazard.

12.5 Selects PPE that will provide adequate protection.

12.6 Utilizes the PPE Certification of Hazard Assessment and Equipment Selection Information.

12.7 Consults with supervisor prior to entering work area(s).

12.0 EVALUATION OF PPE PROGRAM (cont):

USER RESPONSIBILITIES (cont):

12.8 Warns any individual not wearing the required PPE.

12.9 Tests and inspects PPE prior to use.

12.10 Maintains respirator and other PPE in good working condition.

12.11 Dons and removes PPE properly.

12.12 Recognizes and understands PPE limitations.

12.13 Complies with PPE policy and procedures.

13.0 USER PERFORMANCE CRITERIA

13.1 Safely performs all steps of the practice.

13.2 Meets minimum section demands for speed and accuracy.

13.3 Can explain why and when the job must be done.

13.4 Can explain why each step in the practice is needed.

13.5 Can identify basic facts and terms about the job.

13.6 Utilizes equipment, tools, and supplies as they were designed and intended to be used.

13.7 Recognizes and reports any unsafe conditions/acts immediately.

13.8 Recognizes, understands, and complies with Federal, State and local standards that apply throughout this practice.

13.9 Uses good oral and written communications skills.

14.0 CROSS REFERENCES:

14.1 Health & Safety Program, MDC HS-1144, "Contamination Control".

14.2 Health & Safety Program, MDC HS-1105, "Visitor and Contractor Safety".

14.3 Health & Safety Program, MDC HS-1162, "Respirator Protection Program".

15.0 REGULATORY/PERMIT REQUIREMENTS

15.1 CFR 29 Part 1910.132: PPE shall be provided, used and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards that could be encountered in a manner capable of causing injury in the function of any part of the body through absorption, inhalation or physical contact.

15.2 CFR 29, Part 1910.133: Protective eye and face equipment shall be required where there is a reasonable probability of injury that can be prevented by such equipment.

15.3 CFR 29, Part 1910.134: The employee shall use the provided respiratory protection in accordance with instruction and training received. Respirators shall be regularly cleaned and disinfected. Respirators shall be stored in a convenient, clean, and sanitary location. Respirators shall be inspected routinely.

15.4 CFR 29, Part 1910.120: Whenever engineering controls and work practices are not feasible, PPE shall be used to reduce and maintain exposures to or below the permissible exposure limits of substances regulated by CFR 29, Part 1910, Subpart Z (Toxic and Hazardous Substances).

16.0 GLOSSARY OF TERMS

16.1 Permissible Exposure Limit (PEL): The legally established time-weighted average (TWA) concentration or ceiling concentration that shall not be exceeded.

16.2 Time Weighted Average (TWA): The average concentration of a contaminant in air during a specific time period (usually 8 hours).

16.3 Threshold Limit Values (TLVs): Time-weighted concentrations of airborne substances to which nearly all workers may be continuously exposed (during 8-hour work days and 40 hour work weeks) without adverse effects.

16.4 Threshold Limit Value - Ceiling (TLV-C): The concentration that should not be exceeded during any part of the working exposure.

16.5 LEL/Meter Instrument used to determine the Lower Explosive Limit (LEL) and/or oxygen content of an atmosphere.

16.6 Break-through: Occurs when a respirator filter fills up with contaminants and no longer protects the wearer.

EXHIBIT 1

CRITERIA FOR THE SELECTION OF PPE

EYE/FACE PROTECTION

Personal Hazard	Protection Required
❍ Low Energy flying solids	Safety glasses with side shields
❍ High energy flying solids	Face shield or goggles and safety glasses with side shields
❍ Low energy flying liquids	Face shield and safety glasses with side shields
❍ High flying liquids and corrosive liquids	Face shield and goggles

(Note: when respiratory protection is required, a full face respirator can be utilized in lieu of face shield and safety glasses or goggles.)

HEAD PROTECTION

Worn in "hard hat areas" due to the potential for exposure to overhead obstructions or falling objects that sometimes exist in various areas.

FOOT PROTECTION

- ❍ Steel toed footwear is required any time personnel are working with tools or objects that could be dropped or otherwise contact and damage the foot.
- ❍ Highly impermeable footwear is required when foot contact with waste is possible. Leather footwear, once contaminated, cannot be decontaminated properly. Leather footwear is acceptable when worn with impervious boot covers.

PROTECTIVE CLOTHING

- ❍ Tyvek suit is adequate for possible brush contact with solids.
- ❍ Highly impermeable clothing is required for possible contact with sludges or liquids. This clothing includes slicker suits, long slicker coats, polytyvek suits and saranex coveralls.

HAND PROTECTION

- ❍ Leather gloves are adequate for possible abrasion or finger pinches from non-contaminated surfaces.
- ❍ Gloves constructed of synthetic materials are required for possible contact with contaminated surfaces or materials. The chemical/waste being handled dictate the specific type of synthetic glove to be worn.

RESPIRATORY PROTECTION

- ❍ Respiratory protection is required when exposure to contaminants at levels that could exceed ACGIH 8 hour TLV is possible.
- ❍ Supplied air respiratory protection is required when exposure to contaminants at levels that exceed ACGIH 8 hour TLV is imminent, confirmed, or required by specific OSHA standards.

EXHIBIT 2

GLOVE SELECTION

The following lists the type of gloves used at the Model City Facility along with the type of chemicals resistant to them. Discard gloves if they become ripped, torn or discolored due to chemical action.

TYPE OF GLOVE	CHEMICAL GROUP
Nitrile/Neoprene	Acids, caustics, petroleum solvents, aromatic solvents, chlorinated solvents
Rubber or PVC	Acids, caustics, alcohols, low level organic solvents
Latex/Vinyl	Acids, caustics, alcohols
Leather	To protect against injuries; not resistant to chemicals.

CWM Chemical Services, LLC.

Certification of Hazard Assessment and Equipment Selection

Department: Environmental	
Routine Task: Excavation in areas with VOAs > 1 ppm per RFI*	
Assessment Reviewed By: Jill Banaszak	
Signature: Jill Banaszak	**Date:** 9/9/05

PROTECTION	POTENTIAL (Yes or No)	PPE REQUIREMENT
Eyes and Face • Flying particles • Non-corrosive liquid chemicals • Corrosive liquid chemicals • Optical radiation	 Yes No No No	X Safety Glasses Full Face Respirator Face Shield Welding Helmet Welding Shield Other (s) Describe:
Foot • Falling/Rolling Objects • Sole Piercing • Chemical hazards • Electrical hazards	 No No Yes – if excavation will be entered. No	X Work shoes (steel toe, steel midsole, min 6" high with laces X Rubber boots Other (s) Describe:
Head	Yes – Required in operating areas.	X Hard Hat Other (s) Describe:
Hand • Non-corrosive liquid chemicals • Corrosive liquid chemicals • Solid chemicals • Severe cuts or lacerations (cutting tools) • Severe abrasions • Punctures (sharp tools/objects) • Burns (Thermal)	 No No Yes – Contam. soil No No No No	Fabric work gloves with/or abrasion /cut resistant gloves X Chemical protective gloves Type: Neoprene or Nitrile Other (s) Describe:
Body • Non-corrosive liquid chemicals • Corrosive liquid chemicals • Solid chemicals • Burns (Thermal) • Visibility	 No No Yes No No	X Work Uniform with: X Coverall PE (Saranex with hood Other (s) Describe:
Respiratory Nuisance Dust Toxic Dust Chemical gases or vapors	 Yes – if soil dry No Yes	X Half mask respirator with: X Acid/organic cartridge HEPA P100 Filter Full Face Respirator with: Acid/organic cartridge HEPA P100 Filter SCBA Other (s) Describe:
Hearing Loud noise	 No	Ear Plus (Optional) Canal Caps Ear Muffs Other (s) Describe:

* PPE also required if air monitoring is performed with Foxboro TVA100 GC/FID and a reading above 50 ppm (as methane) or if a significant chemical order is noted.

ACTIVITY HAZARD ANALYSIS (AHA)

Model City Facility

Activity: Radiation Survey/Sampling

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Walk over and property line measurements	Stepping on sharp and/or protruding objects	• Recent mowing will enhance visibility • Surveyor must be aware of changing terrain when performing survey • Proper safety footwear will minimize the potential for foot injury • Be aware of damaged fencing wire and posts
	Slips, trips, falls	• Recent mowing will enhance visibility • Surveyor must be aware of changing terrain, wet ground, animal burrows and general debris • Ensure instrument wires, straps and cables do not interfere with walking
	Potential exposure to chemical and radiological contaminants	• Avoid activities that disturb areas with distressed vegetation • Avoid areas that exhibit unusual characteristics (odor, color) or other signs of contamination until properly evaluated • Modify PPE as required by conditions
	Biological Hazards	• Wear light colored clothing or white Tyvek® to allow you to see ticks that are crawling on your clothing. • Tuck your pant legs into your socks or boots, wear high rubber boots, or use tape to close the opening where they meet so that • Wear a hat, tie back long hair. • Apply repellents to discourage tick attachment. Repellents containing permethrin can be sprayed on boots and clothing and will last for several days. Repellents containing DEET (n,n-diethyl m-toluamide) can be applied to the skin, but will last only a few hours before reapplication is necessary. Apply according to Environmental Protection Agency guidelines to reduce the possibility of toxicity. • Learn to identify the toxic plants and avoid them. • Wear long pants and long sleeves, boots and gloves. • Barrier skin creams may offer some protection if applied before contact. • Avoid indirect contact from tools, clothing or other objects that have come into contact with a crushed or broken plant. Don't forget to wash contaminated clothing and clean up contaminated equipment. • If you can wash exposed skin areas within 3-5 minutes with cold running water, you may keep the urushiol from penetrating your skin. • Proper washing may not be practical in remote areas, but a small wash-up kit with pre-packaged alcohol-based cleansing tissues can be effective. • Wear long pants and long sleeves, boots and gloves. • Barrier skin creams may offer some protection if applied before contact.

		• Avoid indirect contact from tools, clothing or other objects that have come into contact with a crushed or broken plant. Don't forget to wash contaminated clothing and clean up contaminated equipment • If you can wash exposed skin areas within 3-5 minutes with cold running water, you may keep the urushiol from penetrating your skin. • Proper washing may not be practical in remote areas, but a small wash-up kit with pre-packaged alcohol-based cleansing tissues can be effective.
	Heat Stress	• Provide water and electrolyte replacement drinks • Allow employees who are not accustomed to working in hot environments appropriate time to become acclimated • Investigate use of auxiliary cooling devices in extreme conditions • Conduct briefings for employees regarding health hazards and control measures associated with heat stress whenever conditions require the implementation of heat stress monitoring
	Cold Stress	• Proper clothing for weather conditions • Available warming stations and warm, non-dehydrating beverages • Survey teams should be reminded to observe physiological indications • Protect instruments from thermal shock and other weather impacts
EQUIPMENT TO BE USED	INSPECTION REQUIREMENT	TRAINING REQUIREMENTS
1. Level D PPE 2. Radiation Detection Instrumentation 3. GPS Equipment	1. Inspect PPE prior to use 2. Source check daily 3. Ensure reception is satisfactory / Ensure that instrumentation is secure in backpack.	• HAZWOPER 40 hour or current 8 hour refresher • Radiation Worker Training • Equipment Operator Specific Training • Safety and health briefing prior to initial operations
PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Vehicular traffic onsite Travel to and at the site	Struck by vehicles Operation of Motor Vehicles	• Be alert to the presence of vehicles • Ensure reflective vest is worn at all times when onsite • Comply with all federal, state, local and site regulations • Inspect vehicles daily and document inspections • Drive defensively • Wear seatbelts while vehicles are in motion • Avoid backing vehicles when possible
EQUIPMENT TO BE USED	INSPECTION REQUIREMENT	TRAINING REQUIREMENTS
Vehicles Trucks/Trailers	Vehicle Inspections	• Licensed for the operation of vehicle

ATTACHMENT C

ACCIDENT PREVENTION PLAN

ACCIDENT PREVENTION PLAN

RESPONSIBILITIES

Project responsibilities are specified in Section 4.0 of the Health and Safety Plan.

SUBCONTRACTORS/CONSULTANTS

All contractors/consultants are required to comply with the CWM safety programs. A contractor/consultant health and safety representative will be designated to serve as the direct contact with CWM in matters of health and safety.

TRAINING

All contractor/consultant personnel are required to attend a safety orientation prior to commencing activities on site. These orientation sessions are documented and filed with other project records. This site orientation will be conducted by a CWM representative. At a minimum, the following topics relevant to this particular project will be presented:

- Chemical and radiological contaminants expected to be encountered on site;
- Slips, trips, and falls;
- Overhead and buried utilities;
- Hazard Communication;
- Appropriate use of PPE (head, eye, hand, and hearing protection);
- Motor vehicle safety;
- Fire prevention;
- Housekeeping;
- Emergency response; and
- Back injury prevention

Safety briefings will be conducted prior to beginning work every day. Topics for the day will be chosen based upon recent activities, worker concerns, near misses, and program requirements. Attendance at these briefings will be recorded and filed with other project safety documentation.

Periodic Safety Committee meetings will take place as deemed necessary. The total number of personnel plus management on site is expected to be small (5-10 people) and so it is expected that the morning “tailgate” will serve the purpose of these program planning and evaluation sessions.

Field personnel will be trained as radiation workers and have OSHA 40 hour Hazardous Material Worker qualification. In addition, workers will have training in the proper response to emergency conditions that may arise during field activities.

INSPECTIONS

Periodic health and safety inspections by CWM will be conducted during field operations to identify conditions which have the potential to cause illness or injury to workers, damage equipment, or put the general public at risk from site operations.

A portion of these inspections will be conducted by the Site's Health & Safety Specialist but some inspections (such as motor vehicles or heavy equipment) will be conducted by other qualified individuals.

ACCIDENT REPORTING

Contractor/consultant shall report to CWM Project Manager as soon as possible all accidents or occurrences (including spills) resulting in injuries to contractor's employees or third parties or damage to property of third parties or CWM, arising out of or during the course of service for CWM by contractor or of any subcontractor of contractor, and when requested, shall furnish CWM with a copy of reports made by contractor's insurers or to others of such accidents and occurrences. For purposes of this paragraph, notice is to be given to at:

CWM Chemical Services, L.L.C.
Model City Facility
P.O. Box 200
1550 Balmer Road
Model City, New York 14107
Attn: Site Health and Safety Specialist
(716) 286-0331

In case of an accident, the contractor/consultant shall furnish his own First Aid treatment care. CWM will assist in any emergency upon request of the contractor/consultant.

MEDICAL SUPPORT

CWM has first aid kits located throughout the facility to aid in the support of minor injuries. CWM will, upon request of the contractor/consultant, supply medical care for the contractor/consultant. CWM currently has on staff, two certified Emergency Medical Technicians to assist in the event of a medical emergency. Additional Ambulatory, Paramedic and Fire Department support is available on the 911 system.

PERSONAL PROTECTIVE EQUIPMENT

The selection of personal protective equipment is based upon an Activity Hazard Analysis performed in accordance with 29 CFR 1910.132 (d). The personal protective equipment that has been selected based on the anticipated hazards is listed in the Health and Safety Plan. This equipment list may be modified as safety conditions warrant.

SAFETY PROGRAMS

CWM will be responsible for reviewing all contractor/consultant company safety program documentation to insure compliance with CWM, OSHA, and project standards.

<u>Description of work</u>

The primary field activity is a radiological survey (walkover) and associated investigative sampling. The physical hazards associated with these activities are discussed in the Health and Safety Plan. The programs described below are implemented to minimize these potential hazards.

<u>Near Miss Reporting</u>

All project personnel are encouraged to report "near miss" occurrences. A "near miss" report is a worker's evaluation of a situation that, if left uncorrected, could cause an accident. The importance of reporting a "near miss" is that it raises awareness of the problem and contains information helpful in avoiding the same situation in the future.

<u>Housekeeping</u>

Poor housekeeping has the potential to play a role in a wide range of accidents. As such, the importance of housekeeping and the expectation that good housekeeping be maintained will be emphasized regularly during safety meetings.

<u>Mechanical Equipment Inspection</u>

No heavy mechanical equipment is expected to be used by CWM’s consultants for the gamma walkover field survey or investigative sampling activities. In the event that heavy equipment is required, the equipment shall be in good working condition with Daily Vehicle Inspection Reports (DVIRs) completed.

<u>Activity Hazard Analysis</u>

Activity Hazard Analyses (AHAs) are used to identify potential safety and health hazards associated with specific project tasks. The AHA is developed prior the beginning activities. The AHA is reviewed periodically during operations and modified as necessary. The Activity Hazard Analysis can be found in Attachment B.

<u>Fire Prevention and Protection</u>

Fire prevention and protection procedures and resources at this project include:

- Emergency services are obtained by calling site extension #200 in accordance with facility’s Contingency Plan. This service will contact the site’s Incident Commander for Emergency Response actions. Based upon the hazard, the site’s Emergency Response Team may be activated, or local Police/Fire Department support may be requested.

- Hot work permits are required prior to performing any flame or spark producing activity.
- Flammable and oxidizing materials are to be properly marked and stored in NO SMOKING areas. Fire extinguishers are to be available in this area.

ALARA Program

The ALARA (As Low As Reasonably Achievable) program describes the approach to radiation protection to manage and control exposures (both individual and collective) to the work force and to the general public to as low as is reasonable, taking into account social, technical, economic, practical, and public policy considerations. As used, ALARA is not a dose limit but a process which has the objective of attaining doses as far below the applicable limits as is reasonably achievable, based on professional judgment.

ALARA principles will be applied to minimize the following types of exposure during operations:

- internal exposure due to airborne radioactive material;
- external exposure due to beta-gamma emitting nuclides; and
- personnel contamination due to direct contact with radioactive material.

Strategies to minimize exposure include:

- the use of coveralls, gloves and shoe covers if necessary to prevent direct contact with radioactive material;
- the use of radiation detection equipment to assess general area radiation levels;
- the use of air sampling devices to assess the airborne concentration of radioactive material;
- the use of respiratory protection if necessary to minimize internal exposure; and
- Administrative controls such as Radiation Worker Training and the use of Radiation Work Permits, which specify radiological controls and access requirements.

Hazard Communication

This program incorporates the OSHA standards and specifically requires:

- a hazardous material inventory that lists the hazardous being used at the work site;
- that Material Safety Data Sheets be obtained before the chemical is used and that they be available to workers for reference at all times;
- that chemical containers be properly labeled; and
- that all subcontractors be provided information regarding the hazards associated with the substances and the proper protective measures against them.

Emergency Response

All personnel on-site will be briefed on the appropriate responses to emergencies that may occur. This will be a component of comprehensive safety indoctrination. Topics covered will include:

- emergency egress;
- responsibilities and lines of authority;
- alarms;
- congregation points and personnel accountability;
- notification of off-site emergency support personnel; and
- types of potential emergencies.

Respiratory Protection Plan

Respiratory protection will be used when airborne contaminants, either radioactive material or chemicals, exist at levels that require personnel protection that cannot otherwise be provided. All personnel requiring the use of respiratory protection will be qualified in its use. This qualification includes a medical exam, a respirator fit-test and a discussion of the purpose and limitations of respirators.

Site Layout

In addition to presenting the route to the closest hospital, Appendix E indicates the site location and surrounding Model City Facility area.

ACTIVITY HAZARD ANALYSIS (AHA)

Model City Facility

Activity: Radiation Survey/Sampling

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Walk over and property line measurements	Stepping on sharp and/or protruding objects	• Recent mowing will enhance visibility • Surveyor must be aware of changing terrain when performing survey • Proper safety footwear will minimize the potential for foot injury • Be aware of damaged fencing wire and posts
	Slips, trips, falls	• Recent mowing will enhance visibility • Surveyor must be aware of changing terrain, wet ground, animal burrows and general debris • Ensure instrument wires, straps and cables do not interfere with walking
	Potential exposure to chemical and radiological contaminants	• Avoid activities that disturb areas with distressed vegetation • Avoid areas that exhibit unusual characteristics (odor, color) or other signs of contamination until properly evaluated • Modify PPE as required by conditions
	Biological Hazards	• Wear light colored clothing or white Tyvek® to allow you to see ticks that are crawling on your clothing. • Tuck your pant legs into your socks or boots, wear high rubber boots, or use tape to close the opening where they meet so that • Wear a hat, tie back long hair. • Apply repellents to discourage tick attachment. Repellents containing permethrin can be sprayed on boots and clothing and will last for several days. Repellents containing DEET (n,n-diethyl m-toluamide) can be applied to the skin, but will last only a few hours before reapplication is necessary. Apply according to Environmental Protection Agency guidelines to reduce the possibility of toxicity. • Learn to identify the toxic plants and avoid them. • Wear long pants and long sleeves, boots and gloves. • Barrier skin creams may offer some protection if applied before contact. • Avoid indirect contact from tools, clothing or other objects that have come into contact with a crushed or broken plant. Don't forget to wash contaminated clothing and clean up contaminated equipment. • If you can wash exposed skin areas within 3-5 minutes with cold running water, you may keep the urushiol from penetrating your skin. • Proper washing may not be practical in remote areas, but a small wash-up kit with pre-packaged alcohol-based cleansing tissues can be effective. • Wear long pants and long sleeves, boots and gloves. • Barrier skin creams may offer some protection if applied before contact. • Avoid indirect contact from tools, clothing or other objects that have come into contact with a crushed or broken plant. Don't forget to wash

		contaminated clothing and clean up contaminated equipment. • If you can wash exposed skin areas within 3-5 minutes with cold running water, you may keep the urushiol from penetrating your skin. • Proper washing may not be practical in remote areas, but a small wash-up kit with pre-packaged alcohol-based cleansing tissues can be effective.
	Heat Stress	• Provide water and electrolyte replacement drinks • Allow employees who are not accustomed to working in hot environments appropriate time to become acclimated • Investigate use of auxiliary cooling devices in extreme conditions • Conduct briefings for employees regarding health hazards and control measures associated with heat stress whenever conditions require the implementation of heat stress monitoring
	Cold Stress	• Proper clothing for weather conditions • Available warming stations and warm, non-dehydrating beverages • Survey teams should be reminded to observe physiological indications • Protect instruments from thermal shock and other weather impacts
EQUIPMENT TO BE USED	INSPECTION REQUIREMENT	TRAINING REQUIREMENTS
1. Level D PPE 2. Radiation Detection Instrumentation 3. GPS Equipment	1. Inspect PPE prior to use 2. Source check daily 3. Ensure reception is satisfactory / Ensure that instrumentation is secure in backpack.	• HAZWOPER 40 hour or current 8 hour refresher • Radiation Worker Training • Equipment Operator Specific Training • Safety and health briefing prior to initial operations
PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Vehicular traffic onsite Travel to and at the site	Struck by vehicles Operation of Motor Vehicles	• Be alert to the presence of vehicles • Ensure reflective vest is worn at all times when onsite • Comply with all federal, state, local and site regulations • Inspect vehicles daily and document inspections • Drive defensively • Wear seatbelts while vehicles are in motion • Avoid backing vehicles when possible
EQUIPMENT TO BE USED	INSPECTION REQUIREMENT	TRAINING REQUIREMENTS
Vehicles Trucks/Trailers	Vehicle Inspections	• Licensed for the operation of vehicle

ATTACHMENT D HOSPITAL ROUTE MAP

1:Start out going SOUTH on MODEL CITY RD toward NY-104 / RIDGE RD. 0.4 miles [Map]

2: MODEL CITY RD becomes INDIAN HILL RD / CR-11. 0.5 miles [Map]

3: Turn SLIGHT RIGHT onto UPPER MOUNTAIN RD / CR-11. 2.5 miles [Map]

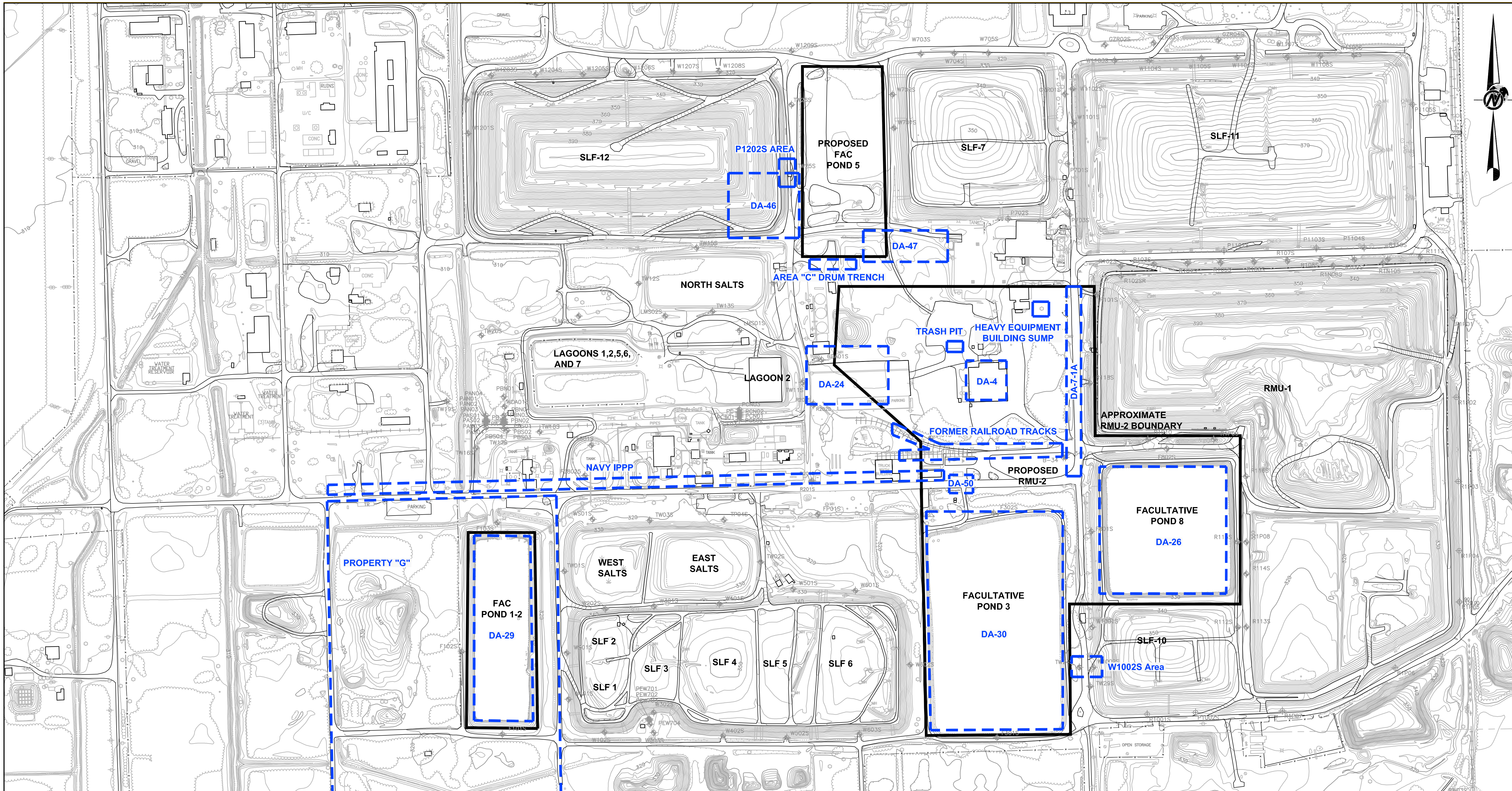
4: Turn RIGHT onto NY-265 / MILITARY RD. <0.1 miles [Map]

END **5:** End at **Mount St Mary's Hospital**
5300 Military Rd, Lewiston, NY 14092, US [Map]

END OF CWM HEALTH AND SAFETY PLAN FOR RMU-2 PROJECT SPECFIC SOIL EXCAVATION AND MONITORING PLAN

APPENDIX 3

SOLID WASTE MANAGEMENT UNITS – RMU-2 DEVELOPMENT AREA



LEGEND

APPROXIMATE SWMU BOUNDARY

APPROXIMATE UNIT BOUNDARY

REFERENCE

1.) BASE MAP COMPILED BY PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY DATED MAY 31, 2001 BY AIR SURVEY CORP., DULLES, VIRGINIA.

200 0 200 400
SCALE FEET

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

PROJECT

CWM CHEMICAL SERVICES, L.L.C.
MODEL CITY, NEW YORK

TITLE

RMU-2 DEVELOPMENT AREAS SWMU LOCATIONS

NJ Authorization #24GA28029100

Golder Associates
Mt. Laurel, New Jersey

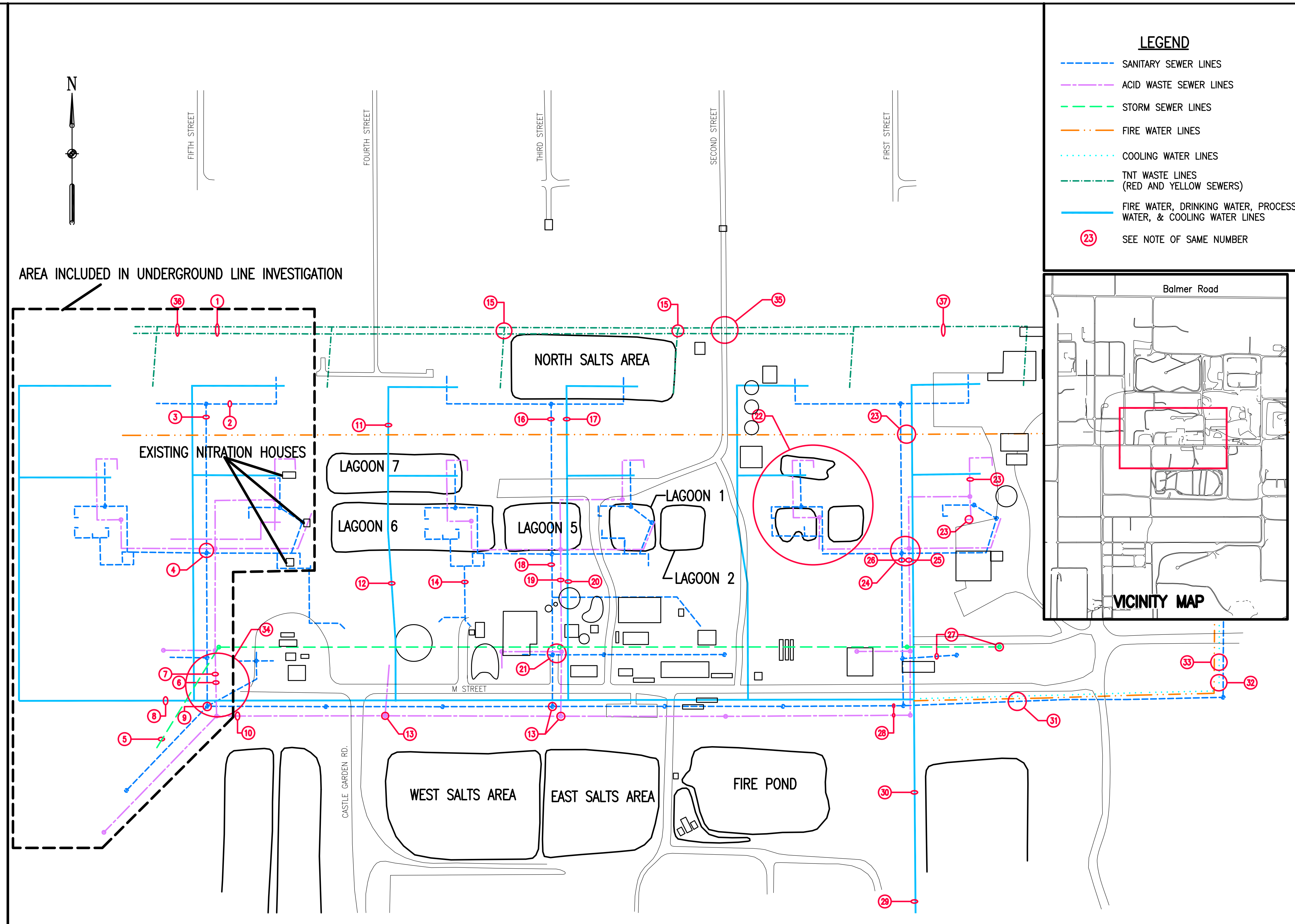
PROJECT No.	133-89021		FILE No.	13389021A001
DESIGN	AL	02/07/13	SCALE AS SHOWN	REV. 0
CADD	RG	02/07/13		
CHECK				
REVIEW				

FIGURE 1

NOTES:

1. SECTION REMOVED AND ENDS PLUGGED, MARCH 1978
2. 24' REMOVED AND ENDS PLUGGED, APRIL 1978
3. 21' REMOVED AND ENDS PLUGGED, APRIL 1978
4. 20' REMOVED AND ENDS PLUGGED IN BOTH LINES APRIL 1978
5. 15' REMOVED AND ENDS PLUGGED, APRIL 1978
6. 20' REMOVED AND ENDS PLUGGED, MAY 1978
7. 8' REMOVED AND ENDS PLUGGED, APRIL 1978
8. COOLING WATER LINE PLUGGED
9. MANHOLE PLUGGED WITH CONCRETE PRIOR TO MARCH 1978
10. 15' REMOVED AND (2) SEWER LINES PLUGGED
11. 20' REMOVED AND ENDS PLUGGED APRIL 1978 (3) 6"ø, (1) 4"ø
12. 8' REMOVED AND ENDS PLUGGED APRIL 1978 (1) 8"ø, (2) 6"ø, (1) 12"ø
13. PLUGGED WITH CONCRETE NOVEMBER 1978
14. 8' REMOVED AND ENDS PLUGGED, APRIL 1978
15. LINES PLUGGED FOR CONSTRUCTION OF NORTH SALTS AREA, FEBRUARY 1977
16. 10' REMOVED AND ENDS PLUGGED, APRIL 1978
17. 15' REMOVED AND PLUGGED (3) 6"ø, (1) 4"ø
18. REMOVED AND PLUGGED JUNE 1978
19. 30x24"ø REMOVED AND PLUGGED, JUNE 1978
20. 12"ø, 8"ø, 6"ø, 4"ø, ALL REMOVED JANUARY 1978. PLUGGED JUNE 1978
21. MANHOLES REMOVED
22. LAGOON #3; #4, REMOVED MAY 1978 AND ALL LINES ENCOUNTERED WERE REMOVED
23. CAPPED OFF
24. 1982 SAMPLE LOCATIONS
25. 9' REMOVED AND PLUGGED, APRIL 1978
26. 20' REMOVED AND PLUGGED, APRIL 1978
27. CUT AND PLUGGED, MAY 1978
28. 20' REMOVED AND PLUGGED, APRIL 1978
29. CUT AND PLUGGED, MAY 1978 (EXCEPT DRINKING WATER)
30. FIRE WATER (WEST), DRINKING WATER (WEST/MID), PROCESS WATER (EAST/MID), COOLING WATER (EAST)
31. BLOCKED AND SEALED APRIL 1978
32. REMOVED FOR CONSTRUCTION OF LAGOON 8
33. BLOCKED APRIL 1978
34. VICINITY OF SAMPLES COLLECTED IN 1990 BY CWM
35. SECTION REMOVED BY CWM 1990

36 37 ENTIRE LENGTH OF TNT WASTE LINE REMEDIATED BY USACE(2000) EXCEPT PORTION UNDER NORTH SALTS AREA



SOURCE: ADAPTED FROM WEHRAN, 1978 AND J.G. WHITE, 1942.

FIGURE 1-6
UNDERGROUND LINES SEALED BY WM, LLC

FILE: P:\Projects\Federal\DOD\ARMY\HTRW2005\Projects\6199004 Phase III RI LOOW\GIS_all\PhaseIII_FSP\CAD\FIG_1-6.DWG

APPENDIX 4

EXAMPLE REPORT

WASTE MANAGEMENT

CWM Chemical Services, LLC.

RMU-2 Project Specific Soil Excavation Monitoring and Management Report

Prepared By: ______________________ **Date of Report:** ____________

1. Excavation Location

Description of Excavation Location: ____

____

GPS Northing: ______________ **Purpose of Excavation:** ______________________

GPS Easting: ______________ ______________________________________

Elevation: ______________ msl ______________________________________

2. Portal Radiation Monitor

(Check here if Portals not used) ☐

Rad Scan Performed By: ______________ **Date of Unit Calibration:** ____________

Date of Rad Scan: ______________ **Serial No. of Unit:** ____________

Use Table 1 to document all vehicle radiological data.

3. Radiological Survey Scan

Rad Scan Performed By: ______________ **Date of Rad Survey:** ____________

Rad Instrument Used: ______________ **Date of Calibration:** ____________

Type of Excavation: (Check One)

- **Clearing & Grubbing** ☐
- **Shallow Trench** ☐
- **Deep Trench** ☐
- **Mass Excavation** ☐

Serial No. of Unit: ____________

Documentation of QC checks performed before and after survey (describe):

____

____

Description of Rad Survey performed: ______________________________

____

____

WASTE MANAGEMENT

Rad Scan Survey Results:

Time	Scan Survey Data	Units	Scan Location (Layer, Lift, Bottom)

Note: Attach sketches, maps or drawings of scan and sample locations as necessary to document exact location of scanning Activities.

If soil or other media samples are collected, complete the following:

Sample ID#	Sample Location			1 Minute Static Count within 1 inch of Sample Location		Estimated Sample Volume (Include Units)
	Northing	Easting	Elevation (msl)	Before	After	

Note: Attach analytical analysis of samples to this report when results are obtained.

4. Chemical Contamination Screening

(Use Table 2 to Complete Chemical Screening Data Reporting if Portals are used.)

PID or FID Used ? ☐

Scan Performed By: ____________________

Date of Survey: ____________________

Instrument Used: ____________________

Date of Calibration: ____________________

Level of PPE Required: __________

Serial No. of Unit: ____________________

Visible Evidence of Chemical Contamination: Yes No (Circle One)

Description of PID Survey performed: ____________________

Time	VOA Screening Data	Units	Scan Location (Layer, Lift, Bottom)

Comments: ____________________

Attach chain of custody and any analytical results of soil samples collected.

CWM Chemical Services, LLC.

RMU-2 Project Specific Soil Excavation Monitoring and Management Report

Table 1
Portal Vehicle Tracking Report

Rad Tech: ____________________ **Date:** ______________

Time	Vehicle Hauler	Vehicle Type	Vehicle #	Scan Results (CPM)	Trip Alarm (Yes or No)

CWM Chemical Services, LLC.

RMU-2 Project Specific Soil Excavation Monitoring and Management Report

Table 2
Chemical Screening Vehicle Tracking Report

Techician: ______________________ **Date:** ________________

Time	Vehicle Hauler	Vehicle Type	Vehicle #	Scan Results (PPM)	Visual Contamination (Yes or No)

"RMU-1 TO RMU-2 TRANSITION PLAN"

TRANSITION PLAN
DEVELOPMENT OF
RESIDUALS MANAGEMENT UNIT NO. 2

CWM CHEMICAL SERVICES, LLC
MODEL CITY, NEW YORK

April 2013
(Revised November 2013)

Prepared By: *CWM Chemical Services, LLC.*
1550 Balmer Road
Model City New York, 14107

TABLE OF CONTENTS

1.0 INTRODUCTION

CWM Chemical Services, LLC (CWM) proposes to construct and operate a residuals management unit for the permanent disposal of hazardous and industrial non-hazardous wastes at the CWM Chemical Services, LLC (CWM), Model City Hazardous Waste Management Facility (Model City Facility).

Prior to and during development of Residuals Management Unit No. 2 (RMU-2), operations at the facility will be modified both temporarily and permanently. This includes the closure, removal/demolition, and/or replacement of Part 373 permitted units and supporting operations that do not require inclusion in the Part 373 permit.

This plan will be used as guide for transition of the facility during the development of RMU-2 and site facilities affected by the development of the landfill.

1.1 DESCRIPTION OF PROPOSED RESIDUALS MANAGEMENT UNIT 2

Proposed RMU-2 incorporates a six (6) cell double-lined fully permittable land burial facility design, in a geologically suitable location, to provide a safe approach to addressing part of the state's hazardous and industrial non-hazardous waste disposal capacity needs over the next 10 to 20 years. RMU-2 will accommodate approximately 4,030,700 cubic yards of waste and will be situated on approximately 43.5 acres of land in the location indicated on Permit Drawing No. 2 of the Part 373 Permit Modification Application. The unit will be constructed in accordance with the requirements of 6 NYCRR 373-2.14. As provided in 6 NYCRR 360-1.1(b), non-hazardous industrial wastes disposed in RMU-2 will be managed in accordance with 6 NYCRR Part 373.

The RMU-2 development area includes current RCRA permitted units, existing supporting facilities not requiring RCRA permit, former RCRA Solid Waste Management Units (SWMUs), RCRA investigation/corrective action areas, underground and above ground utilities, and third-party SWMUs/investigation areas.

1.2 EXISTING FACILITIES IN THE RMU-2 LOCATION

The proposed location for RMU-2 is within an existing developed portion of the Model City Facility currently occupied by the following structures, buildings and operational areas:

1. Drum Management Building (Part 373 Container Storage);
2. Empty Trailer Parking Area;
3. South Trailer Parking Area (Part 373 Container Storage);
4. Emergency Response Garage;

5. Heavy Equipment Maintenance Building;
6. McArthur and “M” Streets;
7. Various aboveground and belowground utilities and communications services;
8. Facultative (Fac) Pond 8 (Part 373 Surface Impoundment);
9. Fac Pond 3 (Part 373 Surface Impoundment);
10. Stabilization Facility Trailer Parking Area (Part 373 Container Storage);
11. Secure landfill- (SLF-) 10 Leachate Building Unloading Ramp (Part 373 Container Storage); and
12. SLF 1-11 Oil/Water Separator Building Unloading Ramp (Part 373 Container Storage).
13. RMU-1 Lift Station (Part 373 Tank)
14. RMU-1 Leachate Forcemain to the Oil Water Separator Building (Part 373 Tank Ancillary Equipment)

RMU-2 development will occur in phases. The initial phase of development will occur over multiple years due to the number of site facilities that will be affected. Multiple facilities will be closed, demolished, and constructed during the first phase of RMU-2 development.

Attachment A presents a conceptual construction/closure sequencing schedule for the first phases of development of RMU-2. The RMU-2 development area includes current RCRA permitted units, existing support facilities not requiring RCRA permits, former RCRA Solid Waste Management Units (SWMUs), RCRA investigation/corrective action areas, underground and above ground utilities, and third-party SWMUs/investigation areas.

As required by CWM’s Sitewide 6 NYCRR Part 373 Permit, a Project Specific Soil Excavation Monitoring and Management Plan (SEMMP) is required for all excavations/soil disturbances exceeding 1,000 square meters (m^2) or 150 cubic meters (m^3). RMU-2 development will exceed these thresholds. A Project Specific SEMMP has been submitted to the NYSDEC for the development of RMU-2 (April, 2013). The SEMMP also includes the procedures to be employed during the excavation and closure of RCRA SWMUs, RCRA investigation/corrective action areas, and third-party SWMUs/investigation areas. RCRA permitted units will be closed in accordance with the Sitewide Closure Plan in CWM’s Part 373 Permit.

The following sections describe the affect on existing operations during the construction of RMU-2 for the initial and subsequent phases.

2.0 RMU-2 PHASED CONSTRUCTION

2.1 GENERAL

The initial phases of construction for Cells 20 and 18 will include the closure, demolition, and/or removal of the following facilities:

1. Closure of Fac Pond 8
2. Closure & demolition of South Trailer Parking Area
3. Remove/close Empty Trailer Parking Area
4. Demolition of SLF-10 Loading/Unloading Ramp
5. Closure of Fac Pond 3

The initial phases of construction for Cells 20 and 18 will include the construction of the following facilities:

1. Fac Pond 5
2. Fac Pond 5 Transfer Line
3. New Full Trailer Parking Area and Utilization of Empty Trailer Parking Area Northwest of SLF-12
4. New SLF-10 Loading/Unloading Ramp
5. Upgrade Tank T-150 Lift Station
6. New Tank T-150 Transfer Line
7. West Leachate Forcemain Transfer Line
8. Cells 20 and 18 including Cut-off-Wall, MSE Wall, Subgrade excavation, baseliner installation
9. Wetlands Mitigation Area

Subsequent phases of development of RMU-2 will include construction of Cells 19, 17, 16, and 15 and will include the closure/demolition and the construction of the following:

1. Relocation of Site Water Lines and Site Electric
2. Construction of New Drum Management Building
3. Closure & Demolition of Existing Drum Building & Water Tank Demolition
4. Closure & Demolition of Existing Stabilization Full Trailer Parking Areas I & II
5. Construction of New Stabilization Full Trailer Parking Area
6. Closure & Demolition of Existing Stabilization Full Trailer Parking Areas III & IV

7. Demolition of RMU-1 Lift Station and Force Main
6. Relocation of Meteorological Tower
7. Demolition of existing Heavy Equipment Maintenance Building. Construction of new Heavy Equipment Maintenance Building
8. Demolition Emergency Response Garage and Relocate to the Former Transportation Building
9. Construction of new SLF 1-11 Oil/Water Separator Loading/Unloading Ramp. Closure & Demolition of existing SLF 1-11 Oil/Water Separator Loading/Unloading Ramp.
10. MacArthur/M Streets - Removal of old Underground Leachate/Water/Sewer Lines
11. Demolition of leachate transfer lines
12. Closure of Former Railroad Bed Area
13. Closure/Removal of DOD Trash Pit
14. Cells 19, 17, 16 and 15 Construction including Cut-off-Wall, MSE Wall, Subgrade excavation, baseliner installation

The following sections describe the phases of development of RMU-2 and how these phases will affect the operation of the facility.

2.2 FACULTATIVE PONDS

The proposed RMU-2 footprint includes land currently occupied by two fac ponds designated as Fac Pond 3 and Fac Pond 8. Fac Pond 8, located immediately west of RMU-1, is permitted for storage of treated wastewater from the facility's Aqueous Wastewater Treatment System (AWTS). Fac Pond 8 is currently out of service and undergoing closure. Fac Pond 3, located west of Fac Pond 8, is currently being used for storage of treated wastewater. Wastewater stored in Fac Pond 3 is discharged to the Niagara River following approval of the pre-qualification testing requirements included in CWM's State Pollutant Discharge Elimination System (SPDES) Permit. Fac Pond 3 will also be closed as a result of RMU-2 development. The closure of Fac Pond 3 will be performed in accordance with the Site-Wide Part 373 Permit requirements, and is described in greater depth below.

In order to compensate for the treated wastewater volume reduction due to the removal of Fac Ponds 3 and 8, new Fac Pond 5 will be constructed between SLF-12 and SLF-7. The construction of Fac Pond 5 will include the construction of Part 373-compliant baseliner system as indicated in the RMU-2 Engineering Report.

Standard operations following construction would include the periodic transfer of treated wastewater from Fac Ponds 1/2 to new Fac Pond 5, which would be installed to replace Fac Pond 3 as the final qualification pond prior to discharge to the Niagara River.

It is anticipated that Fac Pond 5 will be constructed in the first year of site development for RMU-2 . Fac Pond 3 will be used utilized during the construction of Fac Pond 5 and will be closed prior to construction of Cell 18 of RMU-2. Included in the construction of Fac Pond 5 is the installation of two double contained underground transfer pipes for the transfer of the treated wastewater between the Fac Ponds 1/2 and Fac Pond 5 and/or to discharge to the Niagara River upon pre-qualification. The existing influent and effluent piping at Fac Ponds 1/2 and Fac Pond 3 will be modified, as necessary, to accommodate the fac pond reconstruction.

Upon construction of Fac Pond 5, Fac Pond 3 will be closed in accordance with the procedures in the Site-Wide Closure Plan with the exception that the pond area will not be backfilled to grade. The Site-Wide Closure Plan will be modified to allow for only backfilling the Fac Pond 3 to offset hydrostatic uplift.

The closure of Fac Pond 3, as described in the Model City Facility's Site-Wide Closure Plan, consists of discharging treated effluent from the fac pond following approval of the pre-qualification testing requirements included in CWM's SPDES Permit. Following discharge of treated effluent, residual water may be transferred to Fac Ponds 1/2 or Fac Pond 5, and the soils at the base of Fac Pond 3 will then be sampled in accordance the Site-Wide Closure Plan.

It will then be determined if removal of the soils and sediments from the bottom of Fac Pond 3 is needed based on the results of the initial sampling described above. If concentrations of hazardous constituents do not exceed Industrial Soil Cleanup Objectives provided in 6 NYCRR Part 375-6.8(b), the soils and sediments from the pond areas will be excavated to achieve design grades for RMU-2. In the event concentrations of hazardous constituents exceed Industrial Soil Cleanup Objectives provided in 6 NYCRR Part 375-6.8(b) in the surface samples, but not in the samples collected at the 6-inch depth, a minimum of 6 inches of soil/sediment will be removed from the base of the pond and properly disposed. The remaining soils will be excavated to achieve design grades for RMU-2.

If concentrations of hazardous constituents exceed the criteria indicated 6 NYCRR Part 375-6.8(b) in the subsurface samples, but not in the surface samples, the upper twelve inches of material will be removed from the bottom of the facultative pond and disposed of properly. In the event that materials are removed, post-removal sampling will be conducted to confirm that the indicated criteria above have been achieved. The sampling and analysis program described in the Site-Wide Closure Plan will be repeated (including sampling locations and analytical parameters) except that only the one inch surface samples will be collected. The results of the post-removal sampling will be used to demonstrate clean closure.

Excavation and disturbance of soils associated with construction of Fac Pond 5 and closure of Fac Pond 3 will be performed in accordance with the requirements of the RMU-2 Soil Excavation Monitoring and Management Plan.

2.3 SOUTH TRAILER PARKING AREA

The existing South Trailer Parking Area, located south of the existing Empty Trailer Parking Area, is used for the storage of liquid and solid, RCRA regulated, TSCA regulated and non-hazardous containers. These containers consist of the following:

- Box trailers holding hazardous and non-hazardous, New York State Department of Transportation- (NYSDOT-) approved containers;
- Bulk tanker trailers, vacuum trailers or other bulk containers holding liquids;
- Covered roll-off trailers, covered dump trailers or other bulk containers holding solid materials; and
- Flatbed or lowboy trailers holding transformers or containers of contaminated solid materials.

A portion of the existing South Trailer Parking Area is located within the footprint of RMU-2 and the West Leachate Forcemain. As such, the existing South Trailer Parking Area will be removed and a new area will be constructed along the western edge of RMU-2. The new Full Trailer Parking Area would include a reinforced concrete base with concrete curbing on three sides. Prior to construction of the new Full Trailer Parking Area, the existing South Trailer Parking Area will be closed in accordance the closure requirements included in the Site-Wide Part 373 Permit. In general, closure activities to be implemented for the existing South Trailer Parking Area will include the following:

- An initial inventory of all wastes within the South Trailer Parking Area will be performed to verify accuracy with current records, to confirm the integrity of all waste containers for removal and to identify, by visual observation, any potentially contamination areas.
- All trailers will be transported to the Stabilization Full Trailer Parking Area.
- Following removal of all waste containers, the existing South Trailer Parking Area will be decontaminated by sweeping or vacuuming the floors, followed by washing the floors. Any wastewater generated by the washing will be treated on site at the AWT facility.
- Once the cleaning process has concluded, the structure will be demolished. The containment demolition debris will be landfilled on site or shipped to an appropriate waste management facility.
- Once the concrete is removed, the soil will be inspected for signs of contamination. Any soil showing contamination will be sampled in in accordance with the Sitewide Closure Plan. Depending on the characterization results, the soils will either be removed and disposed of in a RCRA and/or TSCA permitted landfill on-site or off-site or disposed of in a solid waste permitted landfill off-site.

- Soils underlying the South Trailer Parking Area will be excavated as part of RMU-2 construction, in accordance with the requirements of the RMU-2 Soil Excavation Monitoring and Management Plan.

During the closure of the existing South Trailer Parking area and construction of a new containment area the total site capacity for the storage of roll-offs and trailers will be temporarily reduced until the replacement parking area is constructed. The total site capacity will be temporarily reduced by 58 roll-offs or 29 tankers from the existing South Trailer Parking Area. During the closure of the South Trailer Parking area and the construction of the New Full Trailer Parking Area, the Stabilization Full Trailer Parking Area will have sufficient capacity to store the containers from the South Trailer Parking area. The following table provides a summary containment capacities of the South Trailer Parking area and the New Full Trailer Parking Area.

LOCATION	WASTE TYPE	CONTAINER TYPE	STORAGE CAPACITY	AVAILABLE SECONDARY CONTAINMENT (gallons)	REQUIRED SECONDARY CONTAINMENT (gallons)
Existing South Trailer Parking Area	Liquid/Solid	tankers/roll-offs	58 roll-offs or 29 tankers	82,481	68,521
New Full Trailer Parking Area	Liquid/Solid	tankers/roll-offs	48 roll-offs or 24 tankers	66,583	47,449

Note: A maximum of 55,000 gallons of incinerable liquids in tankers will be stored in the New Full Trailer Parking Area and the Stabilization Trailer Parking Area.

2.4 EMPTY TRAILER PARKING AREA

The Empty Trailer Parking Area is used to stage trailers following the off-loading of wastes. The existing Empty Trailer Parking area, currently located southeast of the Leachate Tank Farm (LTF), will be removed. Empty trailers will continue to be stored in an existing area northwest of SLF-12.

2.5 LOADING/UNLOADING RAMPS FOR THE SLF-10 LEACHATE BUILDING AND SLF 1-11 OIL/WATER SEPARATOR BUILDING.

Existing loading/unloading ramps are provided at the SLF-10 Leachate Collection Building west of SLF-10 and the SLF 1-11 Oil/Water Separator Building east of the LTF to provide facilities for vehicle loading/unloading of the tanks within these buildings. Although these buildings and their unloading ramps are not located within the footprint of RMU-2, access to the ramps will be impacted by the RMU-2 project. New ramps will be installed south of the SLF-10 Leachate Collection Building and east of the SLF 1-11 Oil/Water Separator Building and will generally be the same dimensions as the existing ramps. Therefore, the secondary containment capacities will only change slightly. Following construction of the new ramps, the existing ramps will be closed in accordance the closure requirements included in the Site-Wide Part 373 Permit. In general, closure activities to be implemented for the existing ramps will include the following:

- Following construction of the new ramps, the existing ramps will be decontaminated by sweeping or vacuuming the floors, followed by washing the floors. Any wastewater generated by the washing will be treated on site at the AWT facility.
- Once the cleaning process has concluded, the ramp structures will be demolished. The containment demolition debris will be landfilled on site or shipped to an appropriate waste management facility.
- Once the concrete is removed, the soil will be inspected for signs of contamination. Any soil showing contamination will be sampled in in accordance with the Sitewide Closure Plan. Depending on the characterization results, the soils will either be removed and disposed of in a RCRA and/or TSCA permitted landfill on-site or off-site or disposed of in a solid waste permitted landfill off-site.
- Soils underlying the ramps will be excavated as part of RMU-2 construction, in accordance with the requirements of the RMU-2 Soil Excavation Monitoring and Management Plan.

It is anticipated that the ramp at the SLF-10 Lift Station will be replaced for the construction of Cell 20 of RMU-2 and the ramp at the SLF 1-11 Oil/Water Separator Building will be replaced for the construction of Cell 15.

2.6 UPGRADE T-150 LIFT STATION AND NEW TRANSFER LINE

Leachate collected from both RMU-1 and RMU-2 will be pumped to the existing SLF-12 lift station (tank T-150), which will be upgraded to accommodate the anticipated flow rates. To manage this peak flow rate, the existing SLF-12 lift station pump will be replaced with two Godwin GSP300HV or equivalent submersible pumps.

Leachate pumped from the SLF-12 lift station will discharge to the three existing storage tanks located in the LTF for temporary storage prior to treatment at the aqueous wastewater treatment system (AWTS) facility. Two new double-walled HDPE leachate underground transfer lines will be installed from the SLF-12 Lift Station to the LTF during construction of Cell 18. Based on the results of the LTF storage capacity analysis presented in Appendix F of the Engineering Report (February 2013), the temporary storage and treatment capacities of the LTF and AWTS, respectively, are sufficient to manage the anticipated leachate volumes collected from RMU-2.

2.7 REPLACEMENT OF DRUM MANAGEMENT BUILDING

The existing Drum Management Building, located west of RMU-1, is located within the footprint of RMU-2. The new DMB will be constructed prior to closure of the existing DMB and is to be located east of RMU-1. Drum management capacities and procedures in the current Part 373 Permit will be utilized until the New DMB is constructed and certified. Storage capacities and operations will not be affected during construction of the new DMB. The new Drum Management Building will include facilities for storage of drums and other containers, offices, a laboratory and mechanical room. Provisions will also be included for fuels bulking (as is currently performed in the existing Drum Management Building) and transformer decommissioning (to be relocated from the existing T.O. Building). The new DMB will be operated according to the operating procedures for the existing DMB. Following construction of the new Drum Management Building, the existing Drum Management Building will be closed in accordance with the closure requirements included in the Site-Wide Part 373 Permit. In general, closure activities to be implemented for the existing Drum Management Building will include the following:

- An initial inventory of all wastes within the building will be performed to verify accuracy with current records, to confirm the integrity of all waste containers for removal and to identify, by visual observation, any potentially contamination areas.
- All wastes will then be removed from the building and either relocated to the new Drum Management Building, disposed on site or transported off site to an approved hazardous waste management facility.
- Following removal of all waste containers, the Drum Management Building will be decontaminated by sweeping or vacuuming the floors, followed by washing the floors. Any wastewater generated by the washing will be treated on site at the aqueous wastewater treatment (AWT) facility. Once the cleaning process has concluded, the area will be inspected to verify no staining, PCB wipe testing will be performed to confirm PCB decontamination, the the building will be demolished. The building demolition debris will be landfilled on site or shipped to an appropriate waste management facility.
- Once the concrete is removed, the soil will be inspected for signs of contamination. Any soil showing contamination will be sampled in in accordance with the Sitewide Closure Plan. Depending on the characterization results, the soils will either be removed and disposed of in a RCRA and/or TSCA permitted landfill on-site or off-site or disposed of in a solid waste permitted landfill off-site.
- The soils underlying the Drum Management Building will be excavated as part of RMU-2 construction, in accordance with the requirements of the RMU-2 Soil Excavation Monitoring and Management Plan. Following completion of the closure activities, CWM will submit to the NYSDEC a certification that the Drum Management Building has been closed in accordance with the specifications in the Site-Wide Part 373 Permit within 60 days of final closure. Because existing operations will continue at the new Drum Management Building, it is anticipated that most mobile and stationary equipment utilized in the existing Drum Management Building will be transferred to the new building for continued use. Any equipment not planned for reuse will be cleaned, tested for alternate use or managed in accordance with the Site-Wide Part 373 Permit requirements.

The capacity of the existing Drum Management Building is provided in the following table. These capacities will be maintained during the construction of the new Drum Management Building. The capacity of the new Drum Management Building upon completion is also provided below and is included in proposed modifications to Appendix D-1, Attachment D of the

Sitewide Part 373 Permit include in the Permit Modification Application for RMU-2 (February 2013).

Current Permitted Capacity of Drum Management Building

LOCATION	WASTE TYPE	CONTAINER TYPE	STORAGE CAPACITY	AVAILABLE SECONDARY CONTAINMENT (gallons)	REQUIRED SECONDARY CONTAINMENT (gallons)
Area I	Liquid/Solid	drums	688 55-gal drums	4,675	3,784
Area II	Liquid/Solid	drums	320 55-gal drums	1,989	1,760
Area III	Liquid/Solid	drums	36 55-gal drums	251	198
Area IV	Liquid/Solid	drums	36 55-gal drums	251	198
Area V (Floor Trench System)	Liquid	drums	117 55-gal drums	648	644
	Solid	drums	1,376 55-gal drums	NA	NA
Drum Building West Ramp	Liquid	tankers	2-5,500-gal tankers	22,118	10,104
Truck Loading/Unloading Area & Ramp	Solid	drums	1,040 55-gal drums	NA	NA
Area VI, Sections 1, 2 & 3	Solid	drums	956 55-gal drums	NA	NA

Proposed Capacity for New Drum Management Building

LOCATION	WASTE TYPE	CONTAINER TYPE	STORAGE CAPACITY	AVAILABLE SECONDARY CONTAINMENT (gallons)	REQUIRED SECONDARY CONTAINMENT (gallons)
Area 1	Liquid/Solid	drums	504 55-gal drums	9,011	2,772
Area 2	Liquid/Solid	drums	1008 55-gal drums	6,667	5,544
Area 3	Liquid/Solid	drums	1008 55-gal drums	6,914.6	5,544
Area 4	Liquid/Solid	drums	96 55-gal drums	1,244.7	528
Area 5	Liquid/Solid	drums	96 55-gal drums	765.2	528
Area 6	Liquid/Solid	drums	336 55-gal drums	3,768	1,848
Area 7 Fuels Transfer Ramp	Liquid	tankers	2-5,500-gal tankers	21,392	10,681
Area 8 Transformer Flush	Liquid	Drums/ transformers	2,065 gallons	2,065.2	2,065
Area 9 Truck Loading/Unloading Area & Ramp	Liquid/Solid	drums	1,040 55-gal drums	95,681	5,720

2.8 STABILIZATION TRAILER PARKING AREA

The existing Stabilization Trailer Parking Area consists of three separate concrete secondary containment areas, which are located west of the Stabilization Building. The south and west areas (also known as Areas III and IV) are currently permitted for bulk container storage similar to the Full Trailer Parking Area. The north area (also known as Areas I and II) is currently used for storage of non-hazardous materials. The south and west areas are located within the footprint of RMU-2. Prior to RMU-2 construction, the existing north area will be closed in accordance with the Site-Wide Part 373 Permit and removed and a new longer concrete secondary containment will be installed in that location, designed similar to the existing areas.

Following construction of the new Stabilization Trailer Parking Area, the existing west and south Stabilization Trailer Parking Areas will be closed in accordance with the closure requirements included in the Site-Wide Part 373 Permit. In general, closure activities to be implemented for the Stabilization Trailer Parking Areas will include the following:

- An initial inventory of all wastes within the west and south Stabilization Trailer Parking Areas will be performed to verify accuracy with current records, to confirm the integrity of all waste containers for removal and to identify, by visual observation, any potentially contamination areas.
- All trailers will be transported to the new Stabilization Trailer Parking Area or alternative area.
- Following removal of all waste containers, the existing west and south Stabilization Trailer Parking Areas will be decontaminated by sweeping or vacuuming the floors, followed by washing the floors. Any wastewater generated by the washing will be treated on site at the AWT facility.
- Once the cleaning process has concluded, the structures will be demolished. The containment demolition debris will be landfilled on site or shipped to an appropriate waste management facility.
- Once the concrete is removed, the soil will be inspected for signs of contamination. Any soil showing contamination will be sampled in in accordance with the Sitewide Closure Plan. Depending on the characterization results, the soils will either be removed and disposed of in a RCRA and/or TSCA permitted landfill on-site or off-site or disposed of in a solid waste permitted landfill off-site.
- Soils underlying the west and east Stabilization Trailer Parking Areas will be excavated as part of RMU-2 construction, in accordance with the requirements of the RMU-2 Soil Excavation Monitoring and Management Plan.

During the closure of the north Stabilization Trailer Parking area and construction of a new containment area the total site capacity for the storage of roll-offs will be temporarily reduced until the replacement parking area is constructed. The total site capacity will be temporarily reduced by 20 roll-offs from the north Stabilization Trailer Parking area. The south and west Stabilization Trailer Parking Areas (Areas III and IV) will continue to be utilized until the new

Stabilization Full Trailer Parking Area is complete. Following completion of the New Stabilization Full Trailer Parking Area, Trailer Parking Areas III and IV will be closed in accordance with the Site-Wide Closure Plan and demolished. The following table provides a summary of the existing Stabilization Trailer Parking area containment capacity and containment capacity upon demolition of the existing containment areas and construction of the New Stabilization Trailer Parking Area.

LOCATION	WASTE TYPE	CONTAINER TYPE	STORAGE CAPACITY	AVAILABLE SECONDARY CONTAINMENT (gallons)	REQUIRED SECONDARY CONTAINMENT (gallons)
Stabilization Facility					
Existing Trailer Parking (north) Area I	Solid	Roll-offs	6 roll-offs	NA	NA
Existing Trailer Parking (north)Area II	Solid	Roll-offs	14 roll-offs	NA	NA
Existing Trailer Parking (west) Area III	Liquid/Solid	Roll-offs	19 roll-offs	39,273	27,887
Existing Trailer Parking (south) Area IV	Liquid/Solid	Roll-offs	9 roll-offs	19,636	13,668
New Stabilization Full Trailer Parking Area	Liquid/Solid	tankers/roll-offs	37 roll-offs or 26 rolloffs and 11 tankers (2,500 gal)	56,106	41,977

Note: A maximum of 55,000 gallons of incinerable liquids in tankers will be stored in the New Full Trailer Parking Area and the Stabilization Trailer Parking Area.

2.9 RMU-1 LIFT STATION AND FORCEMAINS

Construction of RMU-2 will require the closure and demolition of the RMU-1 lift station, including tank T-160, and removal of an underground pipeline currently used to transfer leachate from the RMU-1 lift station to the leachate tank farm. The RMU-1 lift station and tank T-160 will be closed in accordance with the Site-Wide Closure Plan in CWM's Site-Wide Permit.

Once the closure process for the lift station and tank T-160 is complete, the tank and building will be demolished. The demolition debris will be landfilled on site or shipped to an appropriate waste management facility. Once the concrete is removed, the soil will be inspected for signs of contamination. Any soil showing contamination will be sampled in in accordance with the Sitewide Closure Plan. Depending on the characterization results, the soils will either be removed and disposed of in a RCRA and/or TSCA permitted landfill on-site or off-site or disposed of in a solid waste permitted landfill off-site.

The existing RMU-1 underground leachate forcemains in the RMU-2 footprint will be removed by excavation following the RMU-2 Project Specific Soil Excavation Monitoring and Management Plan.

The RMU-1 lift station is located at a low point along the RMU-1 leachate forcemains. A new leachate transfer manhole will, therefore, be installed at this low point and to the east of the RMU-1 lift station. The purpose of the new manhole is to provide a means for leak detection at the forcemain low point. This will allow the majority of the RMU-1 forcemains to remain in service without modification. Two new, identical underground forcemains will be installed from an existing manhole at the northwest corner of RMU-1 to a junction manhole north of RMU-2 Cells 15 and 16. At this junction manhole, flow from the RMU-1 leachate forcemains will combine with flow from RMU-2 Cells 15 and 16 and then continue flowing to the west to the SLF 12 lift station. The proposed layout for the RMU-2 leachate forcemains, as well as modifications to the RMU-1 leachate forcemains are shown on Permit Drawing No. 26.

2.10 HEAVY EQUIPMENT MAINTENANCE BUILDING

The existing Heavy Equipment Maintenance Building, located approximately 250 feet west of RMU-1, would be relocated to the area north of Fac Ponds 1/2. The existing structure, foundation and all existing utilities would be removed to facilitate construction of RMU-2. The new Heavy Equipment Maintenance Building would include a truck bay and office area, and space for maintenance repair equipment. Operations associated with the existing Heavy Equipment Maintenance Building would be maintained at the new location. Soils underlying the building will be excavated as part of RMU-2 construction, in accordance with the requirements of the RMU-2 Soil Excavation Monitoring and Management Plan.

2.11 EMERGENCY RESPONSE GARAGE

The existing Emergency Response Garage, located west of RMU-1, would be relocated to an existing building west of RMU-2 (i.e. Truck Wash Building). The existing structure, foundation and all existing utilities would be removed to facilitate construction of RMU-2. Operations associated with the existing Emergency Response Garage would be moved and maintained at the new location. Soils underlying the garage will be excavated as part of RMU-2 construction, in accordance with the requirements of the RMU-2 Soil Excavation Monitoring and Management Plan.

2.12 MCARTHUR AND “M” STREETS

To facilitate construction of RMU-2, approximately 2,000 linear feet of site roadway (portions of McArthur Street and “M” Streets) would be removed. Although portions of the roads may remain in service for use by waste trucks going to RMU-1 during the initial phase of development and by construction vehicles, the road surface material, road base and all above and belowground utilities along the portions of the roads impacted by RMU-2 would be removed. Removal and excavations in this area will be performed in accordance with the requirements of the RMU-2 Soil Excavation Monitoring and Management Plan.

2.13 EXISTING UTILITIES AND COMMUNICATIONS SERVICES

In November 2002, Blasland, Bouck & Lee, Inc. (BBL) performed a utilities investigation to identify all existing above and belowground utilities impacted by the construction of RMU-2.

There are several underground water supply pipelines and electrical service lines within the proposed RMU-2 footprint. All existing utilities would be removed during either relocation of existing facilities or prior to construction of RMU-2. Excavation would be carefully conducted so that the presence of any previously unidentified utilities can be addressed. Since no underground utilities would be left beneath the RMU-2 landfill, landfill stability would not be affected and the potential for contamination migration along pipelines would not exist. Underground utilities will be excavated as part of RMU-2 construction, in accordance with the requirements of the RMU-2 Soil Excavation Monitoring and Management Plan. Replacements for the current active utilities will be installed prior to removal of the existing utilities; therefore, site operations will not be affected.

2.14 METEOROLOGICAL TOWER

The existing MET tower, located north of SLF-1 through SLF-6, would be relocated during construction of subsequent phases of RMU-2 so that its operation would not be affected by the height of RMU-2. The new location would be determined by CWM, based on approval from the NYSDEC and the DOH.

2.15 RAILROAD BED AREA

In April 1994, a routine surface-water sampling event near the intersection of “M” Street and MacArthur Street at the Model City Facility identified the presence of elevated concentrations of VOCs. A surface-water sampling investigation was performed by CWM both upstream and downstream of the intersection to identify the source and extent of the contamination. The investigation determined that the probable source of the contamination was an abandoned railroad bed located west of the intersection. A supplemental investigation of the abandoned railroad bed was performed in 1997. The supplemental investigation determined that low level VOC contamination (less than 100 ppm) is confined to the Glacial Till layer immediately below the abandoned railroad bed, approximately 25 feet north and south of the railroad bed, extending east to the edge of MacArthur Street and west to the location of former Tank Farm E. Excavations in this area within the RMU-2 footprint will follow the RMU-2 Project Specific Soil Excavation Monitoring and Management.

2.16 CLOSURE/REMOVAL OF DOD TRASH PIT

A burn pit/trash pit was discovered by CWM during an excavation to install leachate lines for the leachate hydraulics controls upgrade (LHCU). Three drums, old batteries, and other debris were found in the pit. CWM excavated through the burn pit but did not remove all of the material. The pit is located near the Fire Water Storage Tank.

The Department of Energy (DOE) investigated the Trash Pit by geophysical investigation, test trenches, direct-push borings, soil, and groundwater sampling. Impacts include lithium, boron, and VOCs. DOE indicated in a Remedial Investigation Report/Management Plan that the preferred remedy is removal with confirmatory soil sampling. Excavations in this area within the RMU-2 footprint will follow the RMU-2 Project Specific Soil Excavation Monitoring and Management Plan.

2.17 SITE CLEARING ACTIVITIES

Prior to construction of RMU-2 and the aforementioned relocated facilities, the limits of work will be surveyed and staked. Erosion control measures will be established prior to any soil disturbance. The areas within the limits of work will then be cleared and grubbed to remove and dispose all objectionable material, such as trees, stumps, stones, brush, shrubs, roots, rubbish and other debris. Trees and other large woody debris will be chipped. Trees and stumps too large to be chipped will be properly disposed. Any existing groundwater monitoring wells or piezometers in the proposed areas for construction will either be marked for protection or abandoned in accordance with applicable regulations.

2.18 EXCAVATION AND LANDFILL SUBBASE

After site preparation has been completed, excavation for RMU-2 would proceed to the subbase grade. The average depth of excavation is approximately 12 feet. On-site visual inspection would confirm the suitability of the subbase and any need for over-excavation of unsuitable material. Compacted clay (that may be taken from approved on-site stockpiles or off-site sources) would be placed in over-excavated areas. A rigid Construction Quality Assurance (CQA) Plan, meeting the requirements of the USEPA and NYSDEC, would be implemented during preparation of the subbase and all aspects of landfill construction.

Hydrostatic uplift calculations in the RMU-2 Engineering Report were based on current available data. Prior to construction, water levels would be confirmed to verify hydrostatic uplift assumptions by the design engineer or qualified geotechnical engineer. Piezometers would be monitored prior to sump excavation to determine if the water level is the same or lower than the design water table. If the same or lower, construction would proceed to design grades, otherwise further evaluation would be conducted before proceeding with construction.

Excavated material would be segregated and stockpiled on site at the Model City Facility for future appropriate uses, including construction of the exterior berms, the compacted clay secondary liner system and the final cover. Additional clay for use in the liner system (described below) would be obtained from existing on-site stockpiles or off-site sources. The exact sources of this clay are not currently known, but would be obtained on a contract basis from appropriately permitted or exempt sources.

During excavation activities to achieve RMU-2 design subgrade elevations, the possibility of encountering contaminated soils within the Glacial Till layer exists. This contamination may be chemical (i.e., volatile organic compounds [VOCs]) or radiological. All excavated contaminated soils would be segregated from soils that would potentially be used in construction of RMU-2. Excavated contaminated soils would be disposed in accordance with all applicable requirements. All excavation and soil disturbance performed as part of construction for RMU-2, relocated facilities or other associated activities, shall be completed in accordance with the requirements of the RMU-2 Soil Excavation Monitoring and Management Plan.

3.0 SURFACEWATER AND LEACHATE MANAGMENT

3.1 SURFACEWATER MANAGEMENT

A Stormwater Pollution Prevention Plan (SWPPP) will be prepared for the development of RMU-2 and related facilities. Surface-water management measures during construction of individual cells (i.e., before placement of wastes into the cells) would involve sediment control barriers consisting of rock check dams, silt fences and/or hay bales. The number and location of these would be determined by the progress of construction operations. All silt fences and hay bales would be removed following re-vegetation of areas that have been disturbed as a result of construction operations. During construction, surface water would be directed to the Model City Facility's existing surface-water collection system. The existing surface-water collection system is monitored for hazardous constituents according to the Model City Facility's *SurfaceWater Sampling and Analysis Plan*. During operation of RMU-2, precipitation entering the cells would be collected in the leachate collection system and treated as leachate.

Water from the final cover system would be treated as surface water. All surfacewater runoff from the final cover system would be directed to the existing stormwater management system and retention basins. The proposed grading for RMU-2 would cause a portion of the perimeter ditch along the western edge of RMU-1 to be unable to gravity drain along the surface to any stormwater basin. Consequently, a storm sewer system would be installed between RMU-1 and RMU-2 to convey runoff that enters this segment of the perimeter ditch to the existing V01 basin. The storm sewer system would consist of a single drop inlet (consisting of pre-cast concrete catch basin structure and a frame and inlet grate) and a series of pre-cast concrete manholes interconnected by smooth-bore corrugated HDPE piping. The storm sewer system would convey flow along the existing RMU-1 perimeter berm and would daylight at the northwest corner of RMU-1. The storm sewer system has been designed to convey the 25-year, 24-hour storm event estimated peak discharge under newly graded conditions.

Ground surfaces surrounding all other areas that will be disturbed as part of the RMU-2 project (e.g., relocated facilities and Fac ponds) will be regraded as necessary to promote drainage to the existing stormwater management system and appropriate stormwater basins. Provisions for increasing the capacity of the stormwater retention areas will be completed as needed based on the 25-year, 24-hour storm event.

3.2 LEACHATE MANAGEMENT

During the transition of landfill operations from RMU-1 to RMU-2 the amount of leachate generated and subsequently treated at the AWT facility will decrease. As of the end of 2012, approximately 10.5 acres of RMU-1 are still open and actively receiving waste. The volume of leachate generated from RMU-1 during 2012 (10.5 acres active area) was approximately 10.3 million gallons, while the average amount of leachate generated by RMU-1 the previous five years (21.8 acres active area) was approximately 15.6 million gallons. Preliminary plans are that approximately 4.5 acres of final cover will be constructed in 2013 with the remaining 5.5 acres constructed in subsequent years depending on waste receipts. Therefore, leachate and contact water generated from the open areas of RMU-1 will be significantly reduced during development of RMU-2.

RMU-2 will be developed in phases over a number of years as landfill airspace is needed. Cell 20 (approximately 6.1) will be constructed during the first phase of landfill development, followed by construction of Cells 18, 19, 17, 16 and 15. Leachate from Cell 20 will be conveyed by double contained forcemain to the primary leachate vault for RMU-1 Cell 2 and tie into the forcemain for RMU-1 Cells 2, 4, 6, 9/10, 11/13, and 12/14. The existing RMU-1 lift station and forcemains have adequate capacity to manage leachate generated from Cell 20. The RMU-1 lift station and forcemain to the leachate tank farm will remain in use until construction of Cell 17. A Leachate Level Compliance Plan (LLCP) for RMU-2 Cell 20 will be prepared, submitted, and approved prior to acceptance of waste in Cell 20. The LLCP for Cell 20 will show that the existing RMU-1 leachate management system and the facility's Aqueous Wastewater Treatment System are adequate to manage leachate from the addition of Cell 20.

New forcemains (West Leachate Forcemain Transfer Line) to manage leachate from Cells 17, 18, and 19 of RMU-2 will be constructed during construction of Cell 18. The new RMU-2 forcemains will convey leachate to the SLF-12 lift station which will be upgraded during construction of Cell 18. The existing above ground leachate forcemains from the SLF-12 lift station to the leachate tank farm will be replaced with new underground forcemains during the Cell 18 construction season.

For construction of Cell 17, the RMU-1 lift station will be closed and demolished and new leachate forcemains (North Leachate Forcemain Transfer Line) will be constructed along the north perimeter berm of RMU-2 to replace the existing forcemains from the RMU-1 lift to the leachate tank farm. The new forcemains will convey leachate to the upgraded SLF-12 lift station.

LLCPs for RMU-2 will be prepared, submitted, and approved for each phase of landfill development prior to acceptance of waste in each new phase.

ATTACHMENT 1

RMU-2 CONCEPTUAL CONSTRUCTION SCHEDULE

CWM Chemical Services, LLC.
Model City Facility
Niagara County, New York

RMU-2 Conceptual Construction Schedule (Initial Phases)

Task ID#	Construction/Closure Description	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1	Complete FP8 Remediation Berm/Close						
2	RMU-1/2 Control Upgrades						
3	Construction of Cell 20 (6.1 A)	Cell 20 Constructon	Cell 20 Construction				
4	Construction of Fac Pond 5	Construct FP 5					
5	Construct Fac Pond 5 Transfer Line	Transfer Line					
6	Remove/Close Fac Pond 3		Pump to FP 1/2				
7	Construct New SLF-10 Loading Ramp						
8	Demo Existing SLF-10 Loading Ramp						
9	Construct Cell 18 (5.8 A)			Construct Cell 18			
10	Construct West Forcemain Transfer Line			Forcemain Line			
11	Demo/Close Existing Full Trailer Parking						
12	Construct New Full Trailer Parking Area						
13	Upgrade Tank T-150 Lift Station						
14	New Tank T-150 Transfer Line to LTF						
15	Construct Cell 19 (5.8 A)					Construct Cell 19	
16	Build New Drum Building					Drum Building Construction	
17	Relocate utilities					Utilities	
18	Wetlands Mitigation	Wetlands					

Treated Wastewater Management

- Filling of Fac Ponds 1/2 from Aqueous Wastewater Treatment System (AWTS) is continuous throughout construction of Fac Pond 5 and Closure of Fac Pond 3
- Fill Fac Pond 3 from Fac Ponds 1/2
- Discharge from Fac Pond 3 to SPDES Outfall 001
- Fill Fac Pond 5 from Fac Ponds 1/2
- Discharge Fac Pond 5 to SPDES Outfall 001

Notes: The above schedule is a conceptual schedule based on the anticipated sequencing of construction and closure of permitted units and may change based on the timing of the modification to the Sitewide Part 373 Permit.