SECTION 8

CLOSURE AND POST-CLOSURE PLAN

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8 CLOSURE AND POST-CLOSURE CARE PLAN

Introduction

The Clinton Landfill No. 3 Municipal Solid Waste Landfill currently has a permitted Closure and Post-Closure Care Plan. This Closure and Post-Closure Care Plan has been prepared for the Clinton Landfill No. 3 Chemical Waste Unit. The proposed final landform (refer to Drawing No. D13) shows the configuration of the facility after closure of all waste disposal units, including the final topography of all constructed areas and the location of all facility-related structures that will remain as permanent features after closure. The proposed end use of the site will be a natural area of passive open space. This end use will serve to preserve open space.

Post-closure care of the Chemical Waste Unit will continue perpetually. Financial assurance will be provided to the USEPA prior to waste acceptance in the proposed Chemical Waste Unit for premature closure and post closure care for a 30 year period after closure. Financial assurance will be maintained into perpetuity in order to provided at least 30 years of post-closure care.

Drawing No. D13 shows the final grades of the Chemical Waste Unit after closure. This closure plan details the steps necessary for the proper closure of the Chemical Waste Unit in the event of an unplanned, premature closure, as well as under the planned, routine closure. Schedules are provided for both of these scenarios. In addition, the steps necessary to care for the Chemical Waste Unit during the post-closure period are described. Cost estimates are presented for closure and post-closure activities, and financial assurance mechanisms (to ensure that funding is available to complete those activities) are described.

The closure plan includes the following benefits:

1. The side slopes of the final landform will typically be 4 horizontal to 1 vertical (4H:1V) to minimize erosion, with a minimum of 5 percent to prevent ponding of water.

2. The final landform will be vegetated with grasses and other suitable grasses to provide erosion protection, establish a diverse grassland habitat, and improve the appearance of the final land surface.

3. The engineered final cover system will minimize infiltration of precipitation into the Chemical Waste Unit and promote evapotranspiration and drainage of rain and snow melt from the top of the landfill.

4. The final landform will incorporate terrace berms and other features to prevent erosion and to convey runoff into a stormwater detention basin. The stormwater management system for the facility will improve stormwater management in the area of the proposed Chemical Waste Unit and reduce the flooding potential of downstream areas (refer to Section 4).

Closure Requirements

Implementation of the closure plan will ensure that the Clinton Landfill No. 3 Chemical Waste Unit is properly closed and cared for after filling operations have been completed. The operator must perform the following activities to comply with local, state, and federal closure requirements:

1. Close the site in a manner that prevents post-closure release of waste, waste constituents, leachate, contaminated rainfall, or waste decomposition products to the groundwater, surface water, or to the atmosphere in order to prevent threats to human health or the environment.

2. Maintain drainage ways and swales to safely pass the runoff from the minimum 100-year, 24-hour precipitation event without scouring or erosion (costs included in permitted Clinton Landfill No. 3 Closure and Post Closure Plan).

3. Close the site in a manner that minimizes the need for further maintenance.

4. Develop and maintain a copy of the closure plan at the site or other approved location.

5. Submit a permit application including a revised closure plan upon:

    a. Modification of operating plans or site design affecting the closure.
    b. Modification of the operations of the site that affect the closure.

6. Notify the appropriate regulatory agency of closure within 30 days after the final volume of waste is received.

7. Initiate closure in accordance with the closure plan within 30 days after placement of the final lift of waste.

8. Complete the closure plan within 180 days or as otherwise agreed by the appropriate regulatory agency.

9. Submit plan sheets for the closed site to the appropriate regulatory agency upon completion of closure.

10. Submit an affidavit by the operator and by an Illinois Licenced Professional Engineer that the site has been closed in accordance with the closure plan.

11. Record a notation on the deed to the landfill property or other instrument. A copy of the deed shall be placed in the operating record and the appropriate regulatory agency shall be notified that the notation has been thus recorded.

Premature Closure

Premature closure is the closure of the site at some point in its operating life before all permitted areas have been filled to capacity. For the purpose of this Plan, is the date during the next permit term in which the costs of premature final closure will be the greatest (i.e. largest area of the landfill that requires final cover). For the purposes of this Plan, it is conservatively assumed that the entire 22.5 acre Chemical Waste Unit would need to be closed. Premature closure of the landfill will involve the tasks summarized below.

Determination that Premature Closure is Necessary

Premature closure would typically be initiated in the event of an operator default. Under such circumstances, the operator would not provide the regulatory agency with the customary notification that closure activities have been initiated. Instead, the USEPA and IEPA would determine that unplanned premature closure is necessary and would initiate the closure activities.

Equipment Decontamination

Equipment decontamination will consist of removing accumulated waste and pressure washing the landfill equipment that has been in contact with waste material (e.g., waste removal from tracks and undercarriages). Wash waters will be collected and either solidified and disposed of in the landfill, or disposed of offsite at an appropriately permitted and authorized facility. Equipment will be cleaned prior to the placement of final cover materials.

Remove All Unnecessary Equipment and Structures

All equipment and structures that are not necessary for the post-closure land use will be removed. This will include removing the waste containers and landfill operations equipment (bulldozers, compactor, backhoe, etc.).

Site Security

A fence will have been installed prior to initial operations to restrict access to the site. All gates will be locked, and a sign will be placed near the entrance that states that the facility is closed.

Stormwater Management

At the time of premature closure, all necessary stormwater management structures will have been constructed to accommodate runoff from the developed areas. A perimeter drainage ditch will have been excavated prior to cell development to prevent runoff from flowing into excavation and construction areas. All ditches will be large enough to safely pass runoff from the peak 100-year, 1-hour or 24-hour precipitation events without scouring or erosion. This information is demonstrated in Section 4, which describes the stormwater management program for the facility.

The final lifts of waste will be graded so that the final slopes of the landfill require little maintenance and drain runoff away from the cover. The final overall grade of 4H:1V will be capable of supporting vegetation, and may include terraces, berms, contoured furrows, mulch, and/or erosion blankets to control runoff.

Final Cover Placement

Final cover placement involves the construction of the low permeability and final protective layers (refer to Section 3). The final cover system consists of the following components listed from bottom to top:

- ❑ 12 inches of compacted low permeability barrier soil with a hydraulic conductivity no greater than 1 x 10^{-7} cm/sec;
- ❑ 40-mil HDPE textured geomembrane liner;
- ❑ Geocomposite drainage net; and

- ❑ 3 feet of vegetative cover consisting of 12 inches of amended soil promoting vigorous vegetative growth underlain by 24 inches of protective soil.

All soil materials for construction of the final cover material will be obtained from on-site sources. On the Premature Closure Date, the final cover system will require approximately 36,300 cubic yards of low permeability soil; 980,100 square feet of geomembrane liner; 980,100 square feet of geocomposite drainage net; and 108,900 cubic yards of protective and vegetation soil.

Extensive testing and documentation will be conducted during placement of final cover to ensure that the cover material is constructed according to the approved plans. A list of the tests and the frequency of testing that will be performed is contained in the Construction Quality Assurance Plan (Section 5 of this application). The CQA Plan also describes the documentation, reporting and certification procedures that will be followed during closure.

Low Permeability Barrier Soil Layer. The low permeability barrier soil will be a minimum 12-inch thick layer of low permeable soil compacted to achieve a maximum hydraulic conductivity of $1x10^{-7}$cm/sec. The low permeability layer will serve to minimize the infiltration of precipitation into the landfill following closure. Construction of the low permeability layer will commence no later than 60 days after placement of the final lift of solid waste. The low permeability barrier soils will be derived from stockpiled clay previously excavated from the site, or from another suitable source. The landfill site has a substantial positive earth balance; therefore, an adequate volume of earth materials will be available onsite for final cover construction. The construction of the low permeability barrier soil layer includes foundation preparation, and placement and compaction of the barrier soil layer.

Geomembrane Layer. A 40-mil textured HDPE geomembrane layer will be installed in addition to the 1 foot low permeability barrier soil layer. The geomembrane will serve to further minimize the infiltration of precipitation following closure. Geomembrane installation includes subgrade preparation, and placement and anchoring of the geomembrane.

Geocomposite Drainage Net. A geocomposite drainage net will be installed above the geomembrane layer to minimize hydrostatic head within the protective soil layer and promote drainage from the final landform.

Vegetative Cover Layer. A minimum 3-foot thick vegetative cover layer will be placed over the geomembrane. The vegetative cover will be derived from stockpiled soil excavated during landfill development and/or other onsite borrow soils. These soils predominantly consist of silty clays and silts capable of supporting vegetation. The uppermost 12 inches of the vegetative cover layer will be amended with fertilizers or other soil amendments as needed to ensure vigorous vegetative growth. Alternatively, naturally fertile topsoil will be used for this uppermost 12-inch material. The lower 24 inches of the vegetative cover layer will protect the underlying geocomposite, geomembrane and cohesive soil layers from root penetration and frost.

Seeding and mulching of the vegetative cover layer will occur following placement of the vegetative cover soil materials. Seeding will be performed using a disk or harrow, or by using hydroseeding techniques. The seed mixture selected will be amenable to the soil quality/thickness, slopes and moisture/climatological conditions that exist without the need for continued maintenance and with minimal potential for root penetration into the geocomposite and low permeability barrier layers. The resulting vegetative growth will consist of a hardy blend of grasses suitable for the climate and site conditions that will serve to minimize wind and water erosion. Additional erosion controls, such as placement of silt fences, turf reinforcement, etc. will be placed in order to maintain compliance with all applicable

stormwater quality regulations while the vegetation is being established. Fertilizer, lime, and mulch will be used as necessary to establish proper growth of the seed.

Groundwater Monitoring

At the time of premature closure, all of the proposed groundwater monitoring wells that are located upgradient and downgradient of the developed cells will have been installed as part of the progression of landfill development. Therefore, no additional groundwater monitoring wells will need to be installed in the event of premature closure. Refer to Section 7 for a complete description of the groundwater monitoring plan and to Drawing No. D13 for the proposed location of the groundwater monitoring wells.

CQA Activities

CQA activities will be performed in accordance with the proposed CQA Plan (refer to Section 5 and Appendix K). CQA activities will include:

- ❑ Field and laboratory testing of the low permeability barrier soil;
- ❑ Field inspection and field testing of the geomembrane liner;
- ❑ Laboratory testing of the geomembrane liner;
- ❑ Field inspection and surveys of the vegetative soil cover layer; and
- ❑ Preparation of the CQA Acceptance Report.

Certification of Closure

A Professional Engineer will certify to the appropriate regulatory agency that closure has been completed in accordance with this closure plan and the CQA program. Plan sheets for the closed site will be attached to the certification.

Documentation

A plat of the completed site will be filed with the appropriate land recording authority. A Professional Land Surveyor will prepare this plat. A record of notation will be placed with the deed to the landfill property (or other appropriate instrument) in such a way that any potential purchasers will be notified in perpetuity that 1) the land has been used as a landfill facility, and 2) that they will be held to applicable land use restrictions. The owner or operator shall notify the appropriate regulatory agency that the notation has been recorded and a copy has been placed in the operating record.

Schedule for Premature Closure

It is anticipated that, given favorable conditions, the above tasks can be accomplished within 180 days as shown in the schedule contained in Table 8-1. The closure activity will begin no later than 30 days after the landfill receives the final receipt of waste.

TABLE 8-1
ESTIMATED TIME REQUIRED FOR PREMATURE CLOSURE

ACTIVITY	MONTH #1				MONTH #2				MONTH #3				MONTH #4				MONTH #5				MONTH #6			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Agency Determination that Premature Closure is Necessary																								
2. Equipment Decontamination																								
3. Final Cover Foundation Preparation																								
4. Final Cover Barrier Soil Layer Construction																								
5. Geomembrane Installation																								
6. Vegetative Cover Layer Construction																								
7. Seeding and Mulch																								
8. CQA Acceptance Report / Closure Certification																								

Note: Estimated times assume favorable conditions (i.e. reasonable weather conditions), and begin immediately after final waste acceptance.

Routine Closure

Routine final closure will occur at the end of the intended operating life, when the Chemical Waste Unit has been filled to permitted grades. A total of 22.50 acres of final cover will be placed at the Clinton Landfill No. 3 Chemical Waste Unit throughout its operating life.

Final grades at closure are shown on Drawing No. D13. The closure activities will be performed in accordance with the applicable CQA Plan sections. As outlined below, the procedures described in the premature closure plan will be followed except as noted.

Notification of Closure

Closure activities will begin no later than 30 days after the landfill receives the final volume of waste. The appropriate regulatory agency will be notified during this period that closure has been initiated.

Equipment Decontamination

Equipment decontamination will occur at the end of closure activities and will be conducted as described in the premature closure plan.

Site Security

A fence will be placed to restrict access to the facility as development progresses, and will be completed prior to final closure of the facility. At the time of landfill closure, the fence will be inspected and repaired as needed. A sign will be placed near the entrance that states the facility is closed.

Final Cover Placement

The low permeability barrier soil layer will be constructed no later than 60 days after placement of the final lift of waste. The geomembrane, geocomposite, and vegetative cover layers will be placed as soon as possible thereafter to prevent desiccation, cracking, freezing or other damage to the low permeability barrier soil layer.

Vegetation

After placement of the vegetative cover layer, seeding with suitable grasses to minimize wind and water erosion with mulching activities will be performed. Seeding will occur during optimum planting periods (i.e., before June 10 or after September 1) if the schedule allows.

Groundwater Monitoring

All groundwater monitoring wells will have already been constructed at the time of routine closure. Refer to Section 7 for a complete description of the groundwater monitoring plan and to Drawing No. D13 for the proposed location of the groundwater monitoring wells.

Certification of Closure

Both the Operator and a Professional Engineer will certify to the appropriate regulatory agency that closure has been completed in accordance with this closure plan and the CQA program. Plan sheets for the closed site will be attached to the certification.

Documentation

A plat of the completed site will be filed with the appropriate land recording authority. A Professional Land Surveyor will prepare this plat. The owner or operator shall record a notation on the deed to the landfill property or other appropriate instrument in such a way that any potential purchasers will be notified in perpetuity that 1) the land has been used as a landfill facility, and 2) its use is restricted pursuant to 35 Ill. Admin. Code, Section 811.111(d). The owner or operator shall notify the IEPA that the notation has been recorded and a copy has been placed in the operating record.

Schedule for Routine Closure

Most routine closure tasks are dependent upon weather. It is estimated that routine closure will be completed in approximately six (6) months assuming favorable conditions at the site. A time schedule by task is attached as Table 8-2.

TABLE 8-2
ESTIMATED TIME REQUIRED FOR ROUTINE CLOSURE

ACTIVITY	MONTH #1				MONTH #2				MONTH #3				MONTH #4				MONTH #5				MONTH #6			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Equipment Decontamination	■	■																						
2. Final Cover Foundation Preparation	■	■	■	■	■	■	■	■																
3. Final Cover Barrier Soil Layer Construction									■	■	■	■	■											
4. Geomembrane Installation													■	■	■									
5. Vegetative Cover Layer Construction																■	■	■						
6. Seeding and Mulch																					■			
7. CQA Acceptance Report / Closure Certification																			■	■	■	■	■	

Note: Estimated times assume favorable conditions (i.e. reasonable weather conditions), and begin immediately after final waste acceptance.

Post-Closure Care Requirements

The post-closure care plan describes the steps necessary to monitor and maintain the Clinton Landfill No. 3 Chemical Waste Unit throughout the post-closure period. The post-closure care period begins upon completion of closure activities.

The final cover over the Chemical Waste Unit will be integrated with the final cover over the Municipal Solid Waste Unit. That portion of the final cover that will overlie the Chemical Waste Unit footprint (22.50 acres) will be maintained in perpetuity or until the regulatory agency determines the site no longer poses a threat to the environment.

The Clinton Landfill No. 3 Chemical Waste Unit will meet or exceed the following requirements for post-closure care.

1. Maintain a written post-closure care plan at the site or other approved location.

2. Implement the post-closure care plan upon completion of closure activities.

3. Treat, remove, or dispose of all waste or waste residues within 30 days of the receipt of the final volume of waste. Residues include waste materials removed from the undercarriages or tracks of machinery as part of equipment decontamination.

4. Remove all equipment and structures unnecessary for post-closure land use unless otherwise authorized by a permit.

5. Continue post-closure care activities (inspections, cover maintenance, groundwater monitoring, leachate monitoring, collection and disposal, and surface water monitoring) of the site in accordance with regulatory requirements.

Maintenance and Inspection

The purpose of the maintenance program is to ensure the proper functioning of all engineered features during the post-closure care period. A visual inspection of the entire Clinton Landfill No. 3 Chemical Waste Unit will be performed on a routine basis. A written record of the inspection will be completed and maintained. The inspector will assess the condition and the need for repair of final cover, vegetation, fencing, monitoring points and drainage structures. Quarterly inspections will continue for a minimum of five years after closure, at which point the frequency of inspections may be reduced to annual inspections. Annual inspections would then be conducted in perpetuity or until the regulatory agency deems it no longer necessary. If any deficiencies are identified during the inspections, an assessment and remedial action plan will be implemented immediately. The following features will be inspected:

- ❑ Landfill cover for erosion, rills, gullies, and crevices;
- ❑ Vegetation for evidence of failure or damage, such as due to erosion, landfill gas, etc.;
- ❑ Evidence of excessive landfill settlement, such as standing water, cracks, poor drainage, depressions, holes, etc.;
- ❑ Excessive siltation, erosion or scour in the facility ditches;
- ❑ Culverts for crushing, clogging, and excessive corrosion; and

- ❑ Site boundary fence, gates and locks for evidence of damage and disrepair.

Features will be maintained in accordance with the following specifications:

- ❑ All rills, gullies and crevices 6 inches or deeper will be filled. Desiccation cracking of soil that normally occurs during extremely dry weather does not warrant corrective actions provided the desiccation cracks heal during wet weather.
- ❑ Vegetative cover soils will be replenished in areas where the vegetative cover soil thickness has eroded to less than 2.5 feet.
- ❑ All eroded and scoured drainage channels will be repaired and lining material will be replaced as necessary. Areas identified as particularly susceptible to erosion will be regraded as necessary to minimize such susceptibility.
- ❑ All holes and depressions created by settling will be filled and recontoured to prevent standing water.
- ❑ Stormwater ditches and culverts will be maintained to pass the design stormwater runoff. This may require removing debris buildup at culvert entrances, removing excessive sediment buildup, and/or rebuilding or replacing culverts that have failed structurally.
- ❑ All reworked surfaces, and areas with failed or eroded vegetation in excess of 100 square feet cumulatively, will be revegetated.
- ❑ The final cover will be mowed annually to prevent trees, brush, shrubs, and other deep-rooted vegetation from becoming established.
- ❑ Site boundary fencing, gates, and locks will be repaired as required to maintain site security.

Final Cover

Although the comprehensive CQA program will ensure that the final cover is properly constructed and performs according to design, differential settlement caused by the non-uniform characteristics of waste could potentially result in areas of ponding or erosion on the completed landfill. If this occurs, steps will be taken to immediately repair the problem. Any area where ponding occurs or where erosion cuts six inches or deeper will be promptly replaced, repaired or filled to maintain the integrity of the final cover system.

Furthermore, a certain amount of the surficial final cover soils will erode due to wind and stormwater runoff. It is expected that recently capped areas will require the most maintenance. Over time, the landfill will stabilize such that little, if any, maintenance will ultimately be required. Based upon experience with landfills of this size and location, approximately two percent of the site will require maintenance initially, a decreasing amount thereafter.

Vegetation

Areas of the cover system that are repaired will be re-vegetated. All reworked surfaces and areas with failed vegetation in excess of 100 square feet will be re-vegetated as required. An

average of two percent of the site is assumed to require re-vegetation during the initial years of the post-closure care period, a decreasing amount thereafter. The site will be mowed at least once per year. Mowing will allow greater visibility of the site during site inspections.

Groundwater Monitoring

The Groundwater Monitoring Plan described within Section 7 of this Application will continue to be implemented during the post-closure period. The post-closure care costs developed in this Plan conservatively assume that quarterly monitoring will continue for perpetuity.

All monitoring results will be reported to the appropriate regulatory agency, and groundwater monitoring records shall be maintained at the landfill office or other approved location.

Leachate Management

Leachate will be collected and disposed of in perpetuity unless adequate demonstration can be made to the regulatory agency that this frequency can be reduced based upon leachate conditions within the Chemical Waste Unit. Leachate sampling will be performed as described in Section 7 of this application. The frequency of chemical analysis may be reduced by the regulatory agency based upon a demonstration by the owner or operator that the reduced period is sufficient to protect human health and the environment.

Leachate within the Chemical Waste Unit will be tested as outlined in Section 7 of the Application. Test results will be submitted to the appropriate regulatory agency.

The leachate collection system will be operated and maintained in perpetuity, or for a period determined by the regulatory agency to sufficiently protect public health and the environment. The leachate collection, transfer, and storage systems shall be inspected at least quarterly. Any observed damage or deficiencies shall be repaired as soon as practicable after detection.

Operating and maintaining the leachate collection system will consist of the following primary tasks:

- Maintaining the leachate collection pumps and leachate transfer pump to ensure efficient operation. Maintenance generally consists of removing any excessive build-up of scale and/or iron bacteria. Routine maintenance will be conducted in accordance with the procedures and schedules recommended by the pump manufacturer and as otherwise required.

- Cleaning leachate collection piping as necessary to remove sediment and to open clogged perforations. Leachate pipe cleanout will consist of injecting water at high pressure into the leachate piping. Access to the piping will be provided by the leachate cleanouts.

- Properly disposing excess leachate collected in the leachate tank as necessary.

The post-closure care cost estimates presented in this report include budgeted amounts for annual maintenance activities, monthly and semi-annual leachate sampling/analysis, and cleaning the primary collection system every 5 years.

Surface Water Monitoring

Surface water will be collected in Sediment Basin B and tested for various parameters during the post-closure care period. The post-closure care cost estimates provided for 30 years of semi-annual sampling. Please see Environmental Monitoring (Section 7) for a detailed discussion of the surface water monitoring for the Clinton Landfill No. 3 Chemical Waste Unit.

Record Keeping

Records of all inspections conducted during the post-closure period and copies of all groundwater/leachate/surface water monitoring results will be maintained with the Operating Record at the landfill office or other approved location. The records shall indicate the date, test location, test results and any remedial action taken, if necessary. A copy of the Post-Closure Care Plan will also be made part of the Operating Record.

Security

Gates at the facility entrances will control access into the landfill. The access gates will be locked at all times except to provide access for the inspections, monitoring, maintenance, and other site activities. Fencing, gates and other required security measures will be inspected and maintained during the post-closure period to prevent any unauthorized access to the facility.

Cost Estimates

The closure cost estimate includes the following itemized costs: 1) the cost of applying final cover to the closure area; 2) the cost of equipment decontamination and demobilization; 3) the cost of construction quality assurance activities, and; 4) the cost of certification of closure. The post-closure care cost estimate includes the itemized costs of carrying out all of the activities described in the post-closure care plan.

The closure cost estimate (refer to Table 8-3) assumes closure of the entire unit (22.5 acres) which corresponds to the worst-case "premature closure" scenario. The post-closure care cost estimate (refer to Table 8-4) is based on routine final closure. These estimates reflect current third party costs, and assume the regulatory agency will contract for all closure and post-closure care work.

PREMATURE CLOSURE COST ESTIMATE	$1,716,860
POST-CLOSURE CARE COST ESTIMATE	$1,503,104
TOTAL COST ESTIMATE	**$3,219,964**

The cost estimates have not been reduced by any allowance for the salvage value of equipment or the resale value of land, nor has a discount rate been applied. These estimates will be revised whenever a change in area of the landfill that is active, the closure plan or post-closure care plan is modified.

Closure Cost Estimates

Closure costs were estimated for the assumed closure date. The earthwork volumes, geomembrane square footage, acreage to be seeded, etc. at closure are based upon quantity take-offs. Unit costs for major cost items (geomembrane/geocomposite installation, and earthwork) were based on current vendor quotes. Other unit costs are based on engineering judgment.

Post-Closure Care Cost Estimates

Post-closure care costs were estimated assuming that the landfill prematurely closes at the assumed closure date. The following information provides the basis for the post-closure care cost estimate.

Site Inspections. Site inspections will occur quarterly during the first five years following closure and annually thereafter. Vehicle costs are included in the cost estimate.

Vegetation and Cover Maintenance and Repair. The first years of the post-closure care period will likely require more cover maintenance and repair than the remaining years as the landfill waste stabilizes. Therefore, the post-closure care cost estimate assumes that 10 percent of the cover will require repair to an average depth of 12 inches each year during the first 5 years, and once every 5 years thereafter. The post-closure care cost estimate also assumes that 10 percent of the seeded area will require reseeding and mulching each year thereafter. The cost estimates include mowing the facility each year to prevent trees, brush, shrubs and other deep-rooted vegetation from becoming established on the final cover.

A certain amount of the surficial final cover soils will erode due to wind and stormwater runoff. The post-closure care cost estimate assumes that the upper 6-inches of the vegetative cover soils will be replenished every 15 years.

Leachate Collection. Post-closure care costs associated with leachate management consists of routine leachate pump system maintenance, electrical power for the pump system, and piping cleanout. The estimate for post-closure care following premature closure assumes that leachate is disposed offsite. The leachate disposal volume was conservatively assumed to be 2 gallons per acre per day, which is higher than the calculated leachate generation from the Hydrologic Evaluation of Landfill Performance (HELP) model (0.65 gallons per acre per day).

The leachate collection system piping is not expected to clog with sediments because of the filtering system included in the design. However, over time, biological and/or chemical precipitate clogging could occur. Such clogging will be removed using standard high pressure jetting equipment and techniques. It is anticipated that this will be required no more frequently than every 5 years.

Groundwater Monitoring. A total of 9 groundwater monitoring wells will be monitored following closure on the assumed closure date and following routine closure. It is assumed that these wells will be monitored quarterly as described in Section 7 of this Application. Post-closure costs include labor to sample the wells (1 hour per well, including documentation and travel), sampling equipment costs (vehicle, pH meter, electrical conductivity meter, thermometer, etc.), and analytical costs for both the routine indicator parameters and annual analytical package. The analytical costs are based on typical analytical laboratory fees and include laboratory quality control/quality assurance and reports.

Leachate Monitoring. Leachate will be monitored monthly and semi-annually as described in Section 7 of this Application. The post-closure care cost estimates include sampling labor, equipment and analytical testing.

Surface Water Monitoring. Surface water will be monitored as described in Section 7 of this Application. The post-closure care cost estimates include sampling labor, equipment and analytical testing.

Security. The post-closure care cost estimate includes $1,000 every 5 years for fence and gate repairs.

Data Evaluation and Administration. Routine data evaluation primarily will consist of statistical analysis of the groundwater monitoring data. Other data evaluation activities include reviewing the leachate and surface water monitoring data, and inspection reports. The post-closure care costs estimate also includes the Engineer's data review and Certification Report.

Contingency. The post-closure care cost estimate includes a 2 percent contingency to cover the costs of other, miscellaneous items not specifically identified at this time.

Financial Assurance

Financial assurance will be provided to the appropriate regulatory agency in order to ensure that sufficient money is available to complete landfill closure and post-closure care. The amount of financial assurance that is required at any time will be based on that portion of the Chemical Waste Unit area which has been granted operating authorization and, of that area, how much final cover and other closure work remains to be constructed and approved by the regulatory agency. Financial assurance will be posted within 90 days of the issuance of operating authorization for the Chemical Waste Unit or whenever the closure/post-closure care cost estimates increases. Additionally, annual updates to the closure/post-closure cost estimates will be provided to the appropriate regulatory agency to account for inflation and other increases.

TABLE 8-3
CLINTON LANDFILL NO. 3 CHEMICAL WASTE UNIT
CLOSURE COST ESTIMATES
(22.5 ACRES)

WORK ACTIVITY	UNITS	UNIT COSTS	NO. OF UNITS	COSTS
Landfill Operations Decommissioning				
Equipment Decontamination	*lump sum*	$435.60	1	$435.60
Equipment Demobilization	*lump sum*	$435.60	1	$435.60
Scales Removal	*lump sum*	$1,633.50	1	$1,633.50
			subtotal:	**$2,505**
Install Final Cover Barrier Soil				
Mob/Demob	*lump sum*	$15,246.00	1	$15,246.00
Place / compact foundation layer	*c.y.*	$2.40	36,300	$86,967.54
Place / compact Barrier Soil	*c.y.*	$2.40	36,300	$86,967.54
			subtotal:	**$189,181**
Install Geomembrane				
Mob/Demob	*lump sum*	$5,336.10	1	$5,336.10
Subgrade Preparation	*days*	$1,633.50	5.5	$8,984.25
Material (40-mil HDPE Textured) and Installation	*s.f.*	$0.59	980,100	$574,044.57
			subtotal:	**$588,365**
Install Geonet and Geotextile				
Mob/Demob	*lump sum*	$5,336.10	1	$5,336.10
Material and Installation	*s.f.*	$0.51	980,100	$504,457.47
			subtotal:	**$509,794**
Vegetative Cover				
Mob/Demob	*lump sum*	$5,336.10	1	$5,336.10
Place Cover Soil	*c.y.*	$2.40	108,900	$260,902.62
Seed and Mulch	*1k - s.f.*	$26.14	980	$25,615.89
			subtotal:	**$291,855**
CQA Activiites				
Geomembrane Inspections	*days*	$544.50	7.5	$4,083.75
Geomembrane Testing	*lump sum*	$1,089.00	2.5	$2,722.50
Barrier Soil Inspections	*days*	$544.50	20	$10,890.00
Barrier Soil Lab Testing	*lump sum*	$1,089.00	2.5	$2,722.50
Vegetative Soil Cover Inspection	*days*	$544.50	14	$7,623.00
Vegetative Soil Cover Lab Testing	*lump sum*	$1,089.00	2.5	$2,722.50
Vegetative Soil Cover Surveys	*days*	$1,089.00	1	$1,089.00
Barrier Soil Surveys	*days*	$1,089.00	1	$1,089.00
P.E. Oversight	*hours*	$98.01	130	$12,741.30
Closure Certification	*lump sum*	$5,000.00	1.0	$5,000.00
			subtotal:	**$50,684**
Legal & Administrative	*lump sum*	$2,722.50	1	**$2,723**
Contingency		5.00%		**$81,755**
			TOTAL:	**$1,716,860**

Notes:

1. "Previous Unit Costs" taken from *Clinton Landfill No. 3, IEPA Application for Permit to Develop a Non-Hazardous Landfill, February 2005.*
2. Geomembrane cost was obtained from Poly-Flex, Inc. (September, 2007).

TABLE 8-4
CLINTON LANDFILL NO. 3 CHEMICALWASTE UNIT
POST-CLOSURE COST ESTIMATES
(22.5 ACRES)

ACTIVITY	UNITS	UNIT COSTS	FREQUENCY	POST-CLOSURE UNITS PER EVENT	POST-CLOSURE NO. OF EVENTS	POST-CLOSURE COSTS
Routine Inspections						
Years 1 - 5:						
Labor:	*per hour*	$49.01	*quarterly*	3.5	20	$3,430.35
Equip. / Misc.:	*per event*	$54.45	*quarterly*	1	20	$1,089.00
Years 5 - 30:						
Labor:	*per hour*	$49.01	*annual*	3.5	25	$4,287.94
Equip. / Misc.:	*per event*	$54.45	*annual*	1	25	$1,361.25
					subtotal:	**$10,169**
Cover Maintenance						
Years 1 - 5:						
Equip. Mob / Demob	*lump sum*	$925.65	*annual*	1	5	$4,628.25
Erosion / Settlement Repair (10% of area)	*per c.y.*	$2.40	*annual*	3630	5	$43,483.77
Vegetation Repair (tilling and seeding) (10% of area):	*per 1k - s.f.*	$26.14	*annual*	9.8	5	$1,280.79
Mowing	*per acre*	$27.23	*annual*	22.9	5	$3,111.43
Years 5 - 30:						
Equip. Mob / Demob	*lump sum*	$925.65	*annual*	1	23	$21,289.95
Erosion / Settlement Repair (1% of area)	*per c.y.*	$2.40	*annual*	3714.3	23	$204,669.77
Vegetation Repair (tilling and seeding) (1% of area):	*per 1k - s.f.*	$26.14	*annual*	10	23	$6,011.28
Mowing	*per acre*	$27.23	*annual*	22.9	23	$14,312.57
Vegetative Cover Replenishment						
Equip. Mob / Demob	*lump sum*	$925.65	*every 15 years*	1	2	$1,851.30
Cover Replenishment (100% of area)	*per c.y.*	$2.40	*every 15 years*	18150	2	$86,967.54
Vegetation Repair (tilling and seeding) (100% of area):	*per 1k - s.f.*	$26.14	*every 15 years*	98.0	2	$5,123.18
					subtotal:	**$392,730**
Leachate Collection, and Disposal						
System Maintenance Labor:	*per hour*	$49.00	*quarterly*	12	120	$70,560.00
Pump Removal / Cleaning:	*per hour*	$49.00	*annual*	24	30	$35,280.00
Electrical Power	*per year*	$272.25	*continuous*	2	30	$16,335.00
Pipe Clean-out:	*per event*	$1,089.00	*every 5 yrs*	2	6	$13,068.00
Leachate Trans. and Disposal: (2 gal/acre/day)	*per gallon*	$0.08	*continuous*	16,425	30	$37,547.55
					subtotal:	**$172,791**
Groundwater Monitoring						
Field Labor:	*per hour*	$49.01	*quarterly*	10	120	$58,806.00
Field Equip. and Supplies:	*per event*	$217.80	*quarterly*	4	120	$104,544.00
Analytical Testing for Quarterly Monitoring (see Note 4):	*per quarter*	$702.00	*quarterly*	1	90	$63,180.00
Analytical Testing for Annual Monitoring (see Note 5):	*per year*	$2,862.00	*annual*	1	30	$85,860.00
					subtotal:	**$312,390**
Leachate Monitoring						
Field Labor:	*per hour*	$49.01	*monthly*	2	720	$60,486.17
Field Equip. and Supplies:	*per event*	$54.45	*monthly*	1	360	$19,602.00
Analytical Testing for Monthly Monitoring (see Note 6):	*per sample*	$468.00	*monthly*	1	360	$168,480.00
Field Labor:	*per hour*	$49.01	*semi-annually*	4	60	$11,761.20
Field Equip. and Supplies:	*per event*	$54.45	*semi-annually*	1	60	$3,267.00
Analytical Testing for Semi-Annual Monitoring (see Note 6):	*per sample*	$468.00	*semi-annually*	2	60	$56,160.00
					subtotal:	**$319,756**
Surface Water Monitoring						
Field Labor:	*per hour*	$49.01	*semi-annually*	2	60	$5,040.51
Field Equip. and Supplies:	*per event*	$54.45	*semi-annually*	1	60	$3,267.00
Analytical Testing for Monthly Monitoring (see Note 6):	*per sample*	$468.00	*semi-annually*	1	60	$28,080.00
					subtotal:	**$36,388**
Security	*per event*	$1,089.00	*every 5 yrs.*	1	6	$6,534.00
					subtotal:	**$6,534**
Data Eval. & Closure Certification						
Routine Data Eval.:	*per hour*	$49.01	*quarterly*	8	120	$47,044.80
Annual Reports	*per year*	$2,178.00	*annual*	1	30	$65,340.00
Annual Data Review:	*per hour*	$98.01	*annual*	8	30	$23,522.40
					subtotal:	**$135,907**
Contingency		2.00%				**$27,733**
					TOTAL:	**$1,414,397**

Notes:

1. "Previous Unit Costs" taken from *Clinton Landfill No. 3, IEPA Application for Permit to Develop a Non-Hazardous Landfill, February 2005.*
2. "Unit Costs Updated" were calculated by multiplying the CPI (Inflation Factor) by the Previous Unit Costs.
3. "Inflation Factor" was obtained from U.S. Department of Labor Published CPI values [(Jul. 2007 = 198.989) / (Annual 2004 = 182.6) = 1.089].
4. Quarterly testing will include pH, PCBs, and specific conductance for downgradient wells (6); and temperature, specific conductance, and pH for upgradient wells (3). 2007 lab costs are shown.
5. Annual testing will include pH, PCBs, specific conductance, VOCs, and SVOCs for downgradient wells (6); and temperature, specific conductance, and pH for upgradient wells (3). 2007 lab costs are shown.
6. Monthly/semi-annual leachate and surface water testing will include pH, PCBs, specific conductance, VOCs, and SVOCs. 2007 lab