Attachment I

Closure Plan, Post-Closure Plan, and Financial Requirements

TABLE OF CONTENTS – ATTACHMENT I

TABLE OF CONTENTS – ATTACHMENT I

TABLE OF CONTENTS – ATTACHMENT I

List of Tables

List of Figures

I. CLOSURE PLAN, POST-CLOSURE PLAN, AND FINANCIAL REQUIREMENTS

I-1 Closure Plans

The Greenbelt II Landfill is located approximately 2,500 feet east of Burn's Ditch and approximately 2,500 feet south of Lake Michigan. The Greenbelt II Landfill will ultimately occupy a surface area of approximately 20 acres and has a designed capacity of approximately 1.18 to 1.21 million cubic yards (depending upon whether final cover Option #1 or Option #2 described below is applied). The Greenbelt II Landfill is constructed on a double containment liner and will reach a height of approximately 75 feet above the general surrounding grade if all cells are fully developed. The Greenbelt II Landfill can be utilized for disposal of stabilized dewatered sludges (EPA Hazardous Waste No. F006), treated and solidified industrial nonhazardous process sludges, and possibly contaminated soil and debris [EPA Hazardous Waste No. F006 including remediation wastes from the solid waste management units (SWMUs)], all of which are or were generated on site. The following subsections contain the closure plan for the Greenbelt II Landfill in accordance with the requirements of 329 IAC 3.1-9-1 [40 CFR 264.310 and 264.228]. The location and topography of the landfill is shown on the topographic map included as **Appendix E-5**.

I-1a Closure Performance Standard

The Greenbelt II Landfill will be closed in-place as a landfill. The owner or operator must close the facility in a manner that:

1. Minimizes the need for further maintenance;
2. Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and
3. Complies with the closure requirements of 40 CFR 264, including, but not limited to, the requirements of 40 CFR 264.178, 264.197, 264.228, 264.258, 264.280, 264.310, 264.351, 264.601 through 264.603, and 264.1102.

The closure performance standard will be achieved not only by final closure, but by disposal and operating procedures, which have been implemented in accordance with the Best Demonstrated Available Technology (BDAT) Land Disposal Restriction (LDR) treatment standards. Fly ash solidifies the wastes and produces a strong, incompressible solid mass with a low permeability [the same order of magnitude as the low permeability soil component of the liner system (i.e., 10^{-7} cm/sec)]. Laboratory test results demonstrating the low permeability, high strength and low compressibility of the solidified waste are included in **Appendix I-1**. Analytical results presented in Attachment C demonstrate that the waste TCLP extracts meet the BDAT LDR treatment standards. Thus, operating practices will serve to minimize leachate generation by minimizing infiltration into the waste as a result of the low permeability of the solidified waste.

I-1b Partial Closure and Final Closure Activities

I-1b(1) Interim Cover

As the Greenbelt II Landfill is filled to final waste grades, an optional interim cover consisting of 1 - 2 feet of compacted soil may be placed atop the waste to limit the amount of contact storm water generated. The interim cover will incrementally terminate at the hydraulic barrier configuration shown on Sheets 21 and 28This configuration will provide the division of contact and non-contact water.

I-1b(2) Final Cover

The final cover design incorporates a granulated slag product. The granulated slag is available in abundant quantities from another local facility owned and operated by the permittee. The final cover design consists of two options as indicated below, in descending order:

OPTION #1:

Vegetation layer;

12-inch thick amended granulated slag (or topsoil layer);

30-inch thick granulated slag;

Double-sided Geocomposite;

PVC geomembrane;

24-inch (min.) thick compacted clay;

OPTION #2:

Vegetation layer;

12-inch thick amended granulated slag (or topsoil layer);

30-inch thick granulated slag;

Double-sided Geocomposite;

PVC geomembrane;

Geosynthetic Clay Liner (GCL);

12-inch (min.) thick compacted clay;

Maps showing the extent of final cover and necessary Construction Quality Assurance (CQA) documentation concerning the cover construction will be maintained at the site and updated as the cover is extended.

I-1b(3) Cover Integrity - Settlement

The landfill cover integrity is not anticipated to be compromised by excessive differential settlement or slope failure due to the very strong, incompressible nature of the solidified waste. Settlement calculations predict only 7.0 inches of maximum total settlement in the waste or a differential settlement of less than 1.0 inch per 100 feet. Settlement calculations of the foundation soils and waste are presented in **Appendix I-2**.

I-1c Maximum Waste Inventory

The maximum waste inventory is expected to be 1,183,000 cubic yards for final cover Option #1 and a maximum of 1,213,000 cubic yards will be associated with alternate final cover Option #2. The top of final cover contours will be the same under both Option #1 and Option #2 and the extra waste volume for Option #2 comes from one additional foot of waste replacing one foot of compacted clay. The F006 waste will be the only hazardous or potentially hazardous waste that will remain on site for longer than 90 days. Contaminated runoff during operations and leachate, if any, generated during post-closure will be transmitted to the facility's NPDES-permitted wastewater treatment system.

I-1d Schedule for Closure

I-1d(1) Time Allowed for Closure

Based on the present waste production rates at the facility, the anticipated year of final closure is expected to be between 2040 and 2050. Closure activities will be initiated within 180 days of the placement of final wastes if the final grade is reached during the spring or summer months. See Section I-1d(1)(a) for an extension of closure time, should final wastes be received during fall or winter months.

Within 90 days after final closure, the permittee will submit to the local land authority and the IDEM Commissioner a survey plat indicating the location, dimensions, and the contents of the landfill. This plat will be prepared and certified by a registered professional engineer and/or land surveyor.

I-1d(1)(a) Extension for Closure Time

If final grade is reached in fall or winter, an extension of the closure time will be necessary due to the severe winter climate. If the final volume of waste is received in the fall or winter months, an extension of the 180-day closure period will be requested by the permittee at the time of closure. The anticipated schedule of activities for final closure of the landfill is shown on **Figure I-1**. Copies of this closure plan will be kept at the facility until closure is complete and certified. The permittee and an independent professional engineer will submit certification that the facility has been closed in accordance with the closure specifications and construction documents.

I-1e Closure Procedures

I-1e(1) Inventory Removal

At the time closure is initiated, all hazardous wastes will have been placed in the Greenbelt II Landfill. Therefore, no inventory removal will be required.

I-1e(2) Disposal or Decontamination of Equipment, Structures and Soils

Contaminated equipment used during operation or final closure of the Greenbelt II Landfill will be decontaminated when removed from the active waste disposal area. Decontamination will occur at the containment area south of the Greenbelt II Landfill. The decontamination containment area south of Greenbelt II Landfill is shown on Sheet 29. Wastes generated during

decontamination are gravity fed into the Greenbelt pumphouse for transmission to the facility's wastewater treatment system.

Equipment decontamination will consist of a high-pressure steam wash followed by a water rinse until no visible evidence of contamination remains.

The leachate collection and double-cased transmission line to the Greenbelt pumphouse has been designed so as to require minimal maintenance. The system is gravity drained to the pumphouse. The leachate collection system will be maintained for the 30-year post-closure care period. Maintenance of the system beyond the 30-year post closure care period would only be undertaken if required in accordance with 40 CFR 264.117(a)(2)(ii).

If cleanouts are needed, the piping shall be hydrojetted with conventional sewer cleaning tools. Cleanout for the leachate collection system will be undertaken if noticeable significant changes in the flow occur, or as needed.

If the collection pipes have been plugged or crushed due to construction activities, it shall be repaired or replaced. The collection pipes shall also be accessible by camera, if necessary.

Equipment, structures, or soils that are considered waste at the completion of closure will be handled by a third party in accordance with the applicable requirements of part 262 of 40 CFR.

I-1e(3) Closure of Disposal Units/Contingent Closures

I-1e(3)(a) Disposal Impoundments

No hazardous wastes are managed in disposal impoundments at the facility. Therefore, this section does not apply.

I-1e(3)(b) Cover Design

The Greenbelt II Landfill will be closed in accordance with 329 IAC 3.1-9-1 [40 CFR 264.310]. A final cover will be constructed over the landfill as shown on Sheet 28. The final cover design is described in detail in the following sections. The Construction Quality Assurance (CQA) Plan is included in **Appendix D-1**.

A summary of the proposed final cover Option #1 is as follows (in descending order):

Vegetation layer;

12-inch thick amended granulated slag (or topsoil);

30-inch thick granulated slag;

Double-sided geocomposite;

PVC geomembrane; and

24-inch (min.) thick compacted soil liner.

A summary of the proposed alternate design Option #2 for final cover is as follows:

Vegetation layer;

12-inch thick amended granulated slag (or topsoil);

30-inch thick granulated slag;

Double-sided geocomposite;

PVC geomembrane;

Geosynthetic Clay Liner; and

12-inch (min.) thick compacted soil liner.

The use of granulated slag within a final cover system has been previously approved by IDEM within previous Greenbelt II Permits issued by IDEM in December 2013 and April 2019. This final cover design has been successfully constructed, and proven effective for the Cell B closure project undertaken at the Greenbelt II Landfill in 2010.

Compacted Clay Liner

For Option #1 above, a minimum two-foot thick layer of low permeability (1×10^{-7} cm/sec or less) soil compacted to 95 percent of maximum dry density as determined by ASTM D698 shall be placed directly over the surface of the waste. Moisture content during placement will be maintained at zero to five percent above optimum moisture content as determined by ASTM D698.

For Option #2 above, a minimum one-foot thick layer of low permeability (1×10^{-7} cm/sec or less) soil compacted to 95 percent of maximum dry density as determined by ASTM D698 shall be placed directly over the surface of the waste. Moisture content during placement will be

maintained at zero to five percent above optimum moisture content as determined by ASTM D698.

Geosynthetic Clay Liner

For Option #2 above, a geosynthetic clay liner (GCL) shall be installed directly on top of the one- foot compacted clay liner. The GCL shall be BENTOMAT® ST GCL or an approved equivalent as defined by the compliance with the requirements of these specifications. Equivalent materials shall be approved by the engineer. Due to industry and manufacturing changes, approved equivalents may have improved qualities; however, materials will be required to meet or exceed the acceptance criteria listed in Table IV of the Construction Quality Assurance Plan, (Appendix D-1).

Geomembrane

A textured 30 mil polyvinyl chloride (PVC) geomembrane is proposed to be placed above the prepared low permeability layer. The PVC geomembrane shall extend into a perimeter anchor trench.

PVC geomembrane is pre-fabricated into large panels joined by dielectric welding, which in-turn reduces the amount of field seaming required and reduces field installation time. Dielectric welding is performed by introducing an electrical current into the area to be seamed in order to weld the adjacent pieces together. The dielectric seams are highly reproducible and result in a high quality seam that does not require additional field seaming. Utilizing factory seaming allows for rapid installation that provides a suitable barrier to water. PVC has high puncture strength and abrasion resistance. Because of its high flexibility, PVC liners readily conform to subbase contours and offer acceptable interface friction angles. PVC geomembrane provides good resistance to tensile properties, resists dimensional changes due to temperature fluctuations, and is less likely to experience environmental stress cracking.

A summary of the design calculations and documentation for interface friction and slope stability of the final cover design are included in **Appendix D-2**. Site specific testing for interface friction will also be conducted as part of the testing protocol performed during construction of the final cover system. During construction, testing of the geomembrane will be performed in accordance with the CQA Plan in **Appendix D-1**. The final cover details are shown on Sheet 28.

Geocomposite

A double-sided geocomposite will be installed above the 30 mil PVC geomembrane. The geocomposite shall be placed directly above the geomembrane to provide drainage of the overlying granulated slag and to protect the PVC from installation defects and other deleterious material that may be present during the installation of the overlying granulated slag layer.

The geocomposite will extend beyond the PVC geomembrane anchor trench and daylight along the perimeter access road with mounded gravel/slag placed along the edge for erosion protection as shown on the details on Sheet 28. Testing for the geocomposite will be performed in accordance with the CQA Plan in **Appendix D-1**.

Final Cover Protective Layer

The proposed final cover protective layer will consist of a forty-two (42) inch thick layer of granulated slag material with the uppermost twelve (12) inches blended with a suitable organic amendment for establishing vegetation. Alternatively, the uppermost layer will consist of a layer of topsoil of sufficient thickness to support vegetation needed to minimize erosion concerns. The existing Permit for the Greenbelt II Landfill issued by IDEM in April 2019 incorporates this same design in the final cover system and the design was implemented in the final cover installed at Cell B in 2010. The granulated slag is similar in gradation to local natural sand; however, the granulated slag is more resistant to both wind and water erosion. Granulated slag is less expensive and readily available for use and will help preserve a significant quantity of natural sand resources. The slag will provide protection to the underlying geosynthetics and provide drainage of surface water.

The upper twelve (12) inches of final cover will be blended with an organic amendment capable of sustaining vegetative growth when mixed with granulated slag. Various mixes have been approved previously by IDEM for use within the existing Greenbelt II Permit. Proposed materials to be blended with the granulated slag may include materials such as organic compost, wastewater treatment sludge, peat, topsoil, etc. These materials will aid in lowering the pH of the slag, add nutrients, increase the water holding capacity of the final cover material, and reduce the potential of slag solidification. Topsoil may also be used as an alternative to amending the granulated slag.

During construction, placement and testing requirements for the final cover protective layer will be performed in accordance with the CQA Plan in **Appendix D-1**.

Vegetation Layer

The proposed seed mixture will consist of a mixture of annual rye, seed oats, tall wheat, alfalfa, white sweetclover and alkali grass. This specified mix is proposed due to the ability to produce a quick stand of vegetation in the conditions associated with the use of granulated slag and compost material. The seed mixture can be placed by cast or hydroseeding methods. Proposed application rates and testing frequencies for the upper vegetative layer are presented in the CQA Plan in **Appendix D-1**. If the final cover soils will sustain the American Beachgrass, then that could also be used as an alternative vegetative cover.

In the event that establishment of vegetative cover on the amended slag layer becomes difficult (to the point where significant erosion issues arise because of the sparse vegetation), then vegetation will be established using an alternate soil layer. Options for the soil / vegetative layers may include either a sand layer and native vegetation or a layer of loamy top soil and the vegetation described in the above paragraph.

The cover will be constructed to a maximum slope of 3:1 (Horizontal: Vertical) below the bench and 4:1 above the bench. A plan of the final cover is provided as Sheet 3. Details of the final cover system are provided on Sheet 28.

I-1e(3)(c) Minimization of Liquid Migration

Hydrologic Evaluation of Landfill Performance (HELP) model calculations demonstrate that the final cover will be effective at minimizing liquid migration into the waste materials (see **Appendix I-3** for HELP Model Calculations).

I-1e(3)(d) Maintenance Needs

The final cover system has been designed to function effectively with minimal maintenance. The design incorporates adequate protection for the low permeability soil by freeze/thaw effects by placing 42 inches of material above the top of the low permeability soil. Average frost depth in the area is documented as 42 inches (see **Figure I-2**). Additionally, the granulated slag drainage layer is designed to minimize moisture build-up in the cover system and minimize maintenance due to free/thaw cycles. The granular nature of the foundation soils and the high strength of the solidified sludge reduces the potential for differential settlement and also

diminishes the potential impact that differential settlement would have on the cover's ability to minimize infiltration.

The final cover is anticipated to function effectively with minimal maintenance needs. The vegetation mix included in the above design was utilized for the Cell B closure project undertaken in 2010 and the vegetation is presently well established and has required minimal maintenance to date. If unanticipated maintenance issues arise after closure such as significant erosion features or significant areas of barren vegetation, the final cover will be repaired in accordance with a schedule that is sufficiently protective of human health and the environment.

I-1e(3)(e) Drainage and Erosion

To evaluate erosion potential and maintenance requirements of the final cover, the U.S. Department of Agriculture's Universal Soil Loss Equation (USLE) was used (see **Appendix D-14** for calculations). Calculations predict the average annual soil loss to be 1.66 tons per acre after the vegetation is established. This is within the federal EPA-recommended maximum of 2.0 tons per acre. Therefore, erosion is not considered to be a potential long-term concern.

The final cover system includes a double-sided geocomposite on top of the PVC geomembrane to promote drainage from the protective cover material. Infiltration through the protective layer will be discharged through the double-sided geocomposite and into a toe drain located along the inside edge of the perimeter road. Surface run off calculations included in **Appendix D-14** demonstrate that the final cover design is adequate to handle the peak surface water discharge from a 25 year 24 hour storm event.

I-1e(3)(f) Settlement and Subsidence

The potential for cover settlement and subsidence considering the various contributing aspects to overall settlement was evaluated (presented in **Appendix I-2**). The results of the settlement evaluation show maximum total settlement to be approximately 7.0 inches. Thus, the potential for damage to the cover due to settlement and subsidence is negligible. This is due to the following factors:

- The predominantly granular foundation materials;
- The clay seams present are thin and overconsolidated;
- The waste is solidified prior to placement and compacted when placed; and

- 90% of all settlement of incompressible solid occurs immediately after placement of load.

The above factors form the basis for the conclusion that there will be negligible settlement and subsidence. Therefore, the integrity of the cover is not anticipated to be compromised by differential settlement. Thus, the cover will provide long term minimization of infiltration into the closed landfill.

I-1e(3)(g) Cover Permeability

The solidified sludge placed and compacted in the landfill exhibits a low permeability (i.e., laboratory permeability test results show the solidified sludge compacted during Greenbelt I operations to have an average permeability of approximately 4 x 10^{-7} cm/sec). **Appendix I-1** presents laboratory permeability test results of the solidified sludge. The final cover design includes a PVC geomembrane which typically exhibits a permeability of less than 1 x 10^{-11} cm/sec. The low permeability of the solidified sludge and the final cover systems will minimize infiltration into the closed landfill. The HELP Model predicts that after 50 years, nearly zero leachate generation will occur, principally due to the low permeability of the waste (see **Appendix I-3**). Thus, ponding of water within the closed landfill will not occur.

I-1e(3)(h) Freeze/Thaw Effects

The frost depth at this location is approximately 42 inches, which is consistent with the depth to the geosynthetic components and underlying low permeability soil within the final cover design (see Sheet 28). Therefore, freeze/thaw cycles should not adversely affect the geosynthetic components of the final cover or the underlying low permeability soil layer. Because the lower permeability layers within the final cover are expected to be unaffected by freeze/thaw cycles, the integrity of the cover system and its ability to minimize infiltration will not be adversely affected by freeze/thaw cycles.

I-1e(4) Closure of Containers

No hazardous wastes are managed in containers at the Greenbelt II Landfill. Therefore, this section does not apply.

I-1e(5) Closure of Tanks

No hazardous wastes are managed in tanks for greater than 90 days at the Greenbelt II Landfill. Therefore, this section does not apply.

I-1e(6) Closure of Waste Piles

No hazardous wastes are managed in Waste Piles at the Greenbelt II Landfill. Therefore, this section does not apply.

I-1e(7) Closure of Surface Impoundments

No hazardous wastes are managed in Surface Impoundments at the Greenbelt II Landfill. Therefore, this section does not apply.

I-1e(8) Closure of Incinerators

No hazardous waste incinerators are operated at the Greenbelt II Landfill. Therefore, this section does not apply.

I-1e(9) Closure of Landfills

The various components for the Greenbelt II Landfill final cover design are described in Sections I-1e(3)(b)-(h). Sheets 3, 21, and 28 provide specific final cover engineering design detail. The final cover CQA Plan is included in **Appendix D-1**.

I-1e(10) Closure of Land Treatment Facilities

No hazardous waste Land Treatment Facilities are utilized at the Greenbelt II Landfill. Therefore, this section does not apply.

I-1e(11) Closure of Miscellaneous Units

No hazardous waste is managed in Miscellaneous Units at the Greenbelt II Landfill. Therefore, this section does not apply.

I-1e(12) Closure of Boilers and Industrial Furnaces (BIFs)

No Boilers and Industrial Furnaces are utilized for management of hazardous waste at the Greenbelt II Landfill. Therefore, this section does not apply.

I-1e(13) Closure of Containment Buildings

No Containment Buildings are utilized for management of hazardous waste at the Greenbelt II Landfill. Therefore, this section does not apply.

I-2 Post-Closure Plan/Contingent Post-Closure

The permittee will provide post-closure care as required for a period up to 30 years after the date of completing closure of the Greenbelt II Landfill. Post-closure care will consist of semiannual site inspections, groundwater monitoring, maintenance of the final cover and monitoring equipment, and maintenance of any signs and benchmarks.

I-2a Inspection Plan

The final closed facilities, including cover, fencing, signs, monitoring wells, benchmarks, etc., will be inspected semiannually to ensure that their integrity is not disturbed. After final closure of Greenbelt II, the semiannual inspections will begin and be conducted in the spring and fall. The spring inspection is intended to identify and address damage caused by severe winter conditions and spring rains in a timely manner. The fall inspection is intended to identify deterioration occurring during the summer months in a timely manner prior to onset of severe winter conditions.

Inspection checklists have been developed and are included in Attachment F. These checklists will be completed during inspections. Records will be maintained of inspections and any conditions observed requiring corrective action.

I-2b Monitoring Plan

Groundwater will be monitored in accordance with the permitted groundwater monitoring plan in effect at the time of final closure. Additionally, the leachate collection and removal system and leak detection system will be monitored and maintained during the post-closure care period in accordance with the permitted maintenance plan in effect at the time of final closure.

I-2c Maintenance Plan

Maintenance will be performed as required based upon inspection observations. Types of anticipated maintenance activities may include the following:

- Repair cap to correct the effects of settling, subsidence, erosion, or other unforeseen adverse condition;
- Revegetation of areas of the cap requiring repairs (if sparse vegetation results in significant erosion);
- Repairs and/or maintenance to the leachate collection and removal system and leak detection system;
- Replacement/repair of groundwater monitoring wells, as necessary;
- Fertilization of vegetated cap, as necessary;
- Maintenance of benchmarks;
- Repair/replace portions of security fence and gates; and
- Replace warning signs, as necessary.

Groundwater monitoring wells, piezometers, and sampling equipment will be routinely inspected during the post-closure period as part of the semi-annual groundwater monitoring activities pursuant to Attachment E.

I-2d Land Treatment

This section is not applicable.

I-2e Post-Closure Care for Miscellaneous Units

This section is not applicable.

I-2f Post-Closure Security

The Greenbelt II Landfill is located within the secure and fenced boundary of the Midwest Plant. No hazardous wastes will remain exposed upon completion of closure activities, and no domestic livestock grazing will be allowed. Pursuant to 40 CFR 264.117(b) and (c), if the Commissioner requires the continuation of the security requirements of 40 CFR 264.14, the procedures detailed in **Appendix G** will be followed.

After closure of the Greenbelt II Landfill, the permittee will place a restrictive covenant on the property deed stating that the area occupied by the Greenbelt II Landfill has been used to manage hazardous wastes and that the property uses are restricted. The restrictive covenant will dictate

that the post-closure use of the Greenbelt II Landfill will never be allowed to disturb the integrity of the final cover, liner, or any other component of the containment system, or the function of the facility's monitoring system.

I-2g Post-Closure Contact

The contact during post-closure care will be the permittee, United States Steel Corporation - Midwest Plant, Environmental Department. They may be contacted at:

U.S. Highway 12, Mail Station AE-1
Portage, Indiana 46368
(219) 763-5869

I-3 Notices Required for Disposal Facilities

I-3a Certification of Closure

Within 60 days of completion of closure of the Greenbelt II Landfill unit, and within 60 days of completion of final closure of the Greenbelt II Landfill, closure certification will be submitted to the IDEM Commissioner. The certification will certify that the hazardous waste management unit or facility, as applicable, has been closed in accordance with the specifications of the approved closure plan. The certification will be signed by the owner/operator and by an independent registered professional engineer.

I-3b Survey Plat

No later than the submission of certification of closure of each hazardous waste disposal unit, a survey plat indicating the location and dimensions of the Greenbelt II Landfill with respect to permanently surveyed benchmarks, will be submitted to the local zoning authority (or authority with jurisdiction over local land use) and to the Commissioner. The plat will be prepared and certified by a professional land surveyor and will contain a note, prominently displayed, that states the owner/operator obligation to restrict disturbance of the disposal unit in accordance with applicable 40 CFR 264 Subpart G regulations.

I-3c Post-Closure Certification

Within 60 days of completion of the post-closure care period for each hazardous waste disposal unit, certification will be submitted to the Commissioner. The certification will certify that the post-closure care period for the hazardous waste disposal unit was performed in accordance with

the specifications of the approved post-closure plan. The certification will be signed by the owner/operator and by an independent registered professional engineer.

I-3d Post-Closure Notices

The following post-closure notices will be appropriately filed and submitted:

A record of the type, location, and quantity of hazardous wastes disposed of within each cell or other disposal unit will be submitted to the local zoning authority (or the authority with jurisdiction over local land use) and to the Commissioner no later than 60 days after certification of closure of each disposal unit;

A notation in the deed to the facility property will be made that will, in perpetuity, notify any potential purchasers of the property that (1) the land has been used to manage hazardous waste; (2) use of the land is restricted to activities that will not disturb integrity of the final cover system, or monitoring system during post-closure care period; and (3) the survey plat (item I-3b) and record of waste disposal (noted above) have been submitted to the local zoning authority (or authority with jurisdiction over local land use) and to the Commissioner. This notation must be placed within 60 days of certification of closure of the first waste disposal unit and with 60 days of certification of closure of the last waste disposal unit; and

A certification, signed by the owner/operator, that the notice in the deed has been made, will be submitted to the Commissioner.

I-4 Closure Cost Estimate

The closure cost estimate for the Greenbelt II Landfill is provided in **Table I-1**. As Cells A, B, and C are currently constructed, the closure cost estimate includes costs for closure of portions of these three cells that have not received final cover. After Cell D is constructed and becomes operational, the closure cost estimate would need to be updated to account for the costs for closing Cell D. The installation and certification of final cover (partial closure) will reduce the closure cost estimate after individual areas have been certified as closed.

The closure costs will be regularly adjusted for inflation within 30 days after the close of the permittee's fiscal year. The adjustments will be made as specified by 329 IAC 3.1-15-3(b) [40 CFR 264.142(b)], using an inflation factor derived from the annual Implicit Price Deflator for Gross National Product as published by the U.S. Department of Commerce in its Survey of

Current Business. The inflation factor is computed by dividing the latest published annual deflator by the deflator for the previous year. The closure costs will also be revised if any change in the closure plan increases the cost of closure.

I-5 Financial Assurance Mechanism for Closure

I-5a Closure Trust Fund

The permittee is using Closure Insurance to satisfy its financial assurance obligations for closure. Therefore, this section is not applicable.

I-5b Surety Bond

The permittee is using Closure Insurance as a financial assurance mechanism for closure. Therefore, this section is not applicable.

I-5c Closure Letter of Credit

The permittee is using Closure Insurance to satisfy its financial assurance obligations for closure. Therefore, this section is not applicable.

I-5d Closure Insurance

The permittee is using Closure Insurance to satisfy its financial assurance obligations for closure. The most recent financial assurance documentation submitted to IDEM was included in a letter from the permittee dated March 15, 2023. A copy of this letter is provided in **Appendix I-4**. The amount of the insurance policy used to satisfy the closure financial assurance requirements included in **Appendix I-4** is greater than the Closure Cost Estimate contained in **Table I-1**.

I-5e Financial Test and Corporate Guarantee for Closure

The permittee is using Closure Insurance to satisfy its financial assurance obligations for closure. Therefore, this section is not applicable.

I-5f Use of Multiple Financial Mechanisms

The permittee is using Closure Insurance to satisfy its financial assurance obligations for closure. Therefore, this section is not applicable.

I-5g Use of Financial Mechanism for Multiple Facilities

This section does not apply.

I-6 Post-Closure Cost Estimate

The post-closure cost estimate for the Greenbelt II Landfill is provided as **Table I-2**. Once the facility has been closed and the post-closure period begins, it is assumed that the duration of the post-closure period will be 30 years.

I-7 Financial Assurance Mechanism for Post-Closure Care

I-7a Post-Closure Trust Fund

The permittee is using Post-Closure Insurance to satisfy its financial assurance obligations for post-closure care. Therefore, this section is not applicable.

I-7b Surety Bond

The permittee is using Post-Closure Insurance as a financial assurance mechanism for post-closure. Therefore, this section is not applicable.

I-7c Post-Closure Letter of Credit

The permittee is using Post-Closure Insurance to satisfy its financial assurance obligations for post-closure care. Therefore, this section is not applicable.

I-7d Post-Closure Insurance

The permittee is using Post-Closure Insurance to satisfy its financial assurance obligations for post-closure care. The most recent financial assurance documentation submitted to IDEM was included in a letter from the permittee dated March 15, 2023. A copy of this letter is provided in **Appendix I-4**. The amount of the insurance policy used to satisfy the post-closure financial assurance requirements included in **Appendix I-4** is greater than the Post-Closure Cost Estimate contained in **Table I-2**.

I-7e Financial Test and Corporate Guarantee for Post-Closure Care

The permittee is using Post-Closure Insurance to satisfy its financial assurance obligations for post-closure care. Therefore, this section is not applicable.

I-7f Use of Multiple Financial Mechanisms

The permittee is using Post-Closure Insurance to satisfy its financial assurance obligations for post-closure care. Therefore, this section is not applicable.

I-7g Use of Financial Mechanism for Multiple Facilities

This section does not apply.

I-8 Liability Requirements

I-8a Coverage for Sudden Accidental Occurrences

I-8a(1) Endorsement of Certification

The permittee is fulfilling liability requirements for sudden accidental occurrences by using the Financial Test. Therefore, this section is not applicable.

I-8a(2) Financial Test or Corporate Guarantee for Liability Coverage

The permittee is fulfilling liability requirements for sudden accidental occurrences by using the Financial Test. Appropriate documentation previously submitted to IDEM in a March 28, 2023 letter is provided in **Appendix I-4**.

I-8a(3) Use of Multiple Insurance Mechanisms

The permittee is fulfilling liability requirements for sudden accidental occurrences by using the Financial Test. Therefore, this section is not applicable.

I-8b Coverage for Nonsudden Accidental Occurrences

I-8b(1) Endorsement or Certification

The permittee is fulfilling liability requirements for nonsudden accidental occurrences by using the Financial Test. Therefore, this section is not applicable.

I-8b(2) Financial Test or Corporate Guarantee for Liability Coverage

The permittee is fulfilling liability requirements for nonsudden accidental occurrences by using the Financial Test. Appropriate documentation previously submitted to IDEM in a March 28, 2023 letter is provided in **Appendix I-4**.

I-8b(3) Use of Multiple Insurance Mechanisms

The permittee is fulfilling liability requirements for nonsudden accidental occurrences by using the Financial Test. Therefore, this section is not applicable.

I-8c Request for Variance

This section does not apply.

I-9 Use of State-Required Mechanisms

This section does not apply.

Attachment I – Closure Plan, Post-Closure Plan, and Financial Requirements

TABLES

TABLE I-1
GREENBELT II LANDFILL
CLOSURE COST ESTIMATE

Item	Task Description	Unit[3]	Unit Rate[4]	Quantity	Cost
1.0	Install Low Permeability Clay (2 ft. thick over 10.25 ac) [1, 2]				
	1.1 Purchase and Haul	c.y.	$ 19.15	33,100	$ 633,865
	1.2 Place and Compact	c.y.	$ 4.80	33,100	$ 158,880
2.0	30 mil PVC Geomembrane and Geocomposite[1,2]				
	2.1 Purchase and Install Geomembrane	s.f.	$ 1.00	446,490	$ 446,490
	2.2 Purchase and Install Geocomposite	s.f.	$ 1.15	446,490	$ 513,464
3.0	Install Drainage Layer and Vegetative Cover over 10.25 ac.[1]				
	3.1 Purchase, Haul & Place Granulated Slag (30" thick)	c.y.	$ 19.75	41,340	$ 816,465
	3.2 Purchase, Haul & Place Top Soil (12" thick)	c.y.	$ 19.90	16,540	$ 329,146
4.0	Install Vegetative Cover[1]				
	4.1 Purchase and Install Vegetation	ac.	$ 3,465	10.25	$ 35,516
5.0	Equipment Decontamination				
	5.1 Labor	hr.	$ 125	10	$ 1,250
	5.2 Off-site Disposal of Decontamination Water	gal.	$ 0.38	500	$ 190
6.0	Third Party QA/QC Oversight				
	6.1 Engineering and Testing	l.s.	$ 110,000	1	$ 110,000
		Subtotal			$ 3,045,266
		25% Contingency			$ 761,316
		Total			$ 3,806,582

[1] Based on Cells A, B & C in operation (14.3 Acres), less the sum of Cell A and B areas previously certified closed (1.75 ac of Cell A + 2.3 ac of Cell B certified closed in 2011) = 10.25 ac.

[2] Estimated costs generated from 2010 T.J. Lambrecht bid for Cell B Closure, adjusted for inflation.

[3] l.s. = lump sum, hr. = hour, c.y. = cubic yard, ac. = acres, s.f. = square feet, gal. = gallon.

[4] Costs presented in 2023 dollars.

Table I-2
GREENBELT II LANDFILL
POST-CLOSURE COST ESTIMATE

Item	Task Description	Unit[13]	Unit Rate	Qty.	Frequency per Year	Remaining Post-Closure Years	Cost
1.0	Semiannual Groundwater/Leachate Monitoring[1]						
	1.1 Field Services	l.s.	$ 4,700	1	2	30	$ 282,000
	1.2 Analytical Services (incl. Level IV QA/QC)	l.s.	$ 4,400	1	2	30	$ 264,000
	1.3 Reporting Services	l.s.	$ 3,600	1	2	30	$ 216,000
2.0	Verification Groundwater [2]						
	2.1 Field Services	event	$ 1,000	1	0.5	30	$ 15,000
	2.2 Analytical Services	event	$ 215	1	0.5	30	$ 3,225
	2.3 Reporting Services	event	$ 600	1	0.5	30	$ 9,000
3.0	Appendix IX Groundwater Monitoring [3]						
	3.1 Field Services	event	$ 4,800	1	0.10	30	$ 14,400
	3.2 Analytical Services	event	$ 46,000	1	0.10	30	$ 138,000
	3.3 Reporting Services	event	$ 3,500	1	0.10	30	$ 10,500
4.0	Groundwater Monitoring Maintenance						
	4.1 Well/Piezometer Maintenance	well	$ 820	1	1	30	$ 24,600
	4.2 Groundwater Sampling Equipment [4]	l.s.	$ 15,800	1	-	-	$ 15,800
	4.3 Resurvey Wells/Piezometers (3 total over 30 yrs)	event	$ 6,500	1	0.1	30	$ 19,500
5.0	Third Party Landfill Inspection						
	5.1 Field Work	hr	$ 85	10	2	30	$ 51,000
	5.2 Reporting	hr	$ 85	2	2	30	$ 10,200
6.0	Cap Maintenance						
	6.2 Haul and Place Granulated Slag[5]	c.y.	$ 16.86	16	1	30	$ 8,093
	6.3 Miscellaneous Repairs[6]	l.s.	$ 3,000	1	1	30	$ 90,000
	6.4 Revegetation[7]	ac.	$ 3,600	1	0.20	30	$ 21,600
	6.5 Cap Underdrain System Cleanout[8]	hr.	$ 110.00	16	0.10	30	$ 5,280
7.0	Leachate Collection/Detection System Cleanout						
	7.1.1 On-site Disposal Year 1 [9A]	gal/yr	$ 0.06	732,000	1	1	$ 43,920
	7.1.2 Off-site Disposal Years 2-30 [9B]	gal/yr	$ 0.43	1,253	1	29	$ 15,625
	7.2 Flush Each of 2 Cleanouts[10]	hr.	$ 100	4	0.33	30	$ 3,960
	7.3 Miscellaneous[11]	l.s.	$ 3,250	1	0.10	30	$ 9,750
	7.4 Disposal of Decontamination Water Off-site	gal	$ 0.43	500	1.00	30	$ 6,450
	7.5 Electricity for Pumping Leachate Year 1 [13]	KWHr	$ 0.06	350,000	1.00	1	$ 21,000
	7.6 Electricity for Pumping Leachate Years 2-30 [14]	KWHr	$ 0.06	600	1.00	29	$ 1,044
8.0	Annual Fees	yr.	$ 2,050	1	1.00	30	$ 61,500
			Subtotal				$ 1,361,447
			10% Administrative Costs				$ 136,145
			Subtotal				$ 1,497,591
			25% Contingency				$ 374,398
			Total				$ 1,871,989

* All costs in above table reflect 2023 dollars.

[1] Based on a groundwater monitoring network comprising 16 monitoring wells.

[2] Verification monitoring only required following identification of initial trigger. Assume once every two years. Estimates in 2023 dollars.

[3] App. IX sampling only required following confirmed statistical exceedance. Assume 3 events over the 30 year post-closure period (estimates in 2023 dollars).

[4] Replacement of existing equipment assumed to be required one time during the post-closure care period (estimate in 2023 dollars).

[5] Based on 2010 contractor bid for Cell B closure, but adjusted for inflation to reflect 2023 costs.

[6] Miscellaneous maintenance includes fertilizing twice per year, occasional cap repair, replacement of two monitoring wells and replacement of the security fence and warning signs over the entire post-closure period (2023 dollars).

[7] Assumes 1 acre of landfill cover will require revegetation every 5 years for remaining post-closure period (2023 dollars).

[8] Assumes 1 hour per cleanout @ 16 cleanouts. Cleanout to occur once every 10 years (2023 dollars).

[9A] Assuming leachate production rate reduces at linear rate during 1st year of post-closure from current rates to 1253 gal. predicted by HELP Model and leachate the first year is treated by existing on-site treatment plant.

[9B] 1253 gal. of leachate/year based on HELP Model for Alternate Final Cover Design, Option #2, which was the highest result of the 3 final cover design options.

[10] Assumes 2 hours per cleanout @ 2 cleanouts. Cleanout to occur once every 3 years (2023 dollars).

[11] Assumes replacement of one manhole and 400 feet of pipe once every 10 years (2023 dollars).

[12] l.s. = lump sum, hr. = hour, c.y. = cubic yard, ac. = acre, gal = gallon, yr = year.

[13] One year expected to be required for leachate production rate during operation to be reduced to 1,253 gal. during post-closure predicted by HELP Model. Assuming leachate quantities are reduced at linear rate during 1st year after installation of the final cover is complete, a total of 732,000 gal. of leachate will be produced the 1st year after the final cover is installed. Based on pump specifications, 350,000 KWHrs estimated required to pump 732,000 gal. of leachate estimated to be generated during 1st year after installation of the final cover.

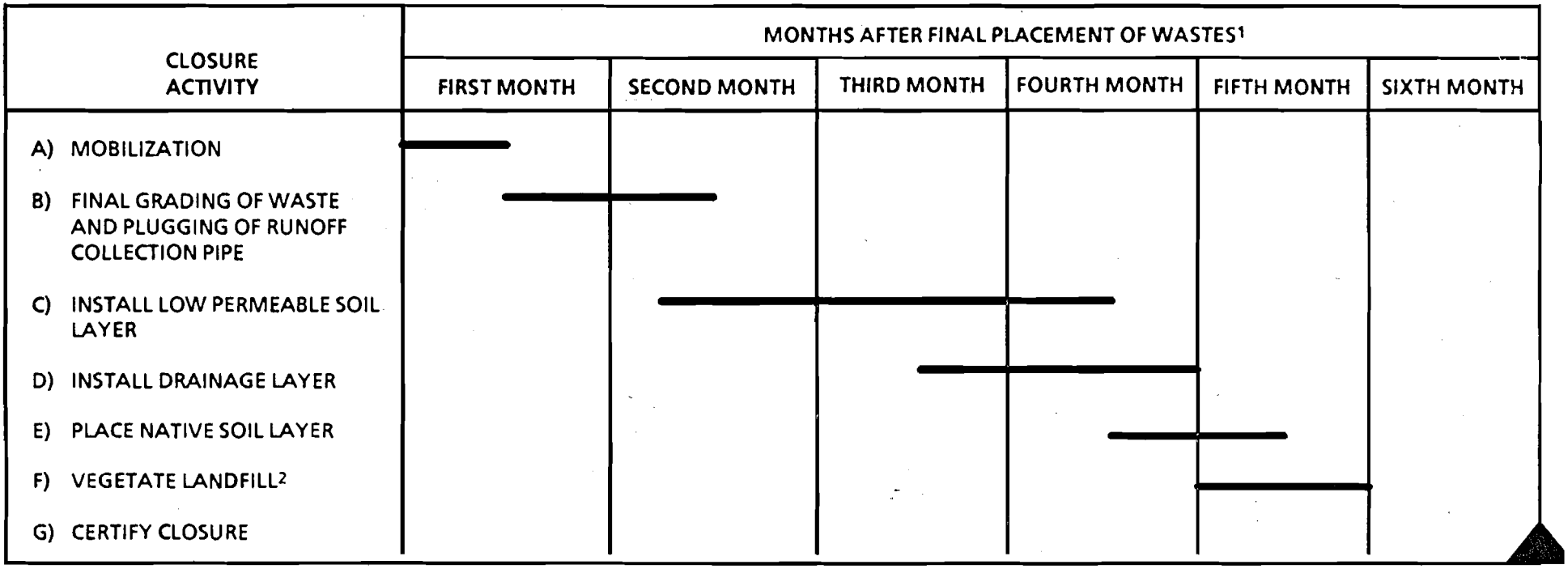
[14] Based on HELP Model, 1,253 gal of leachate expected per year after cap has been installed. Based on pump specifications, 600 KWHrs estimated required to pump 1,253 gal. of leachate estimated to be generated from Year 2 to Year 30 of the post-closure period.

Attachment I – Closure Plan, Post-Closure Plan, and Financial Requirements

FIGURES

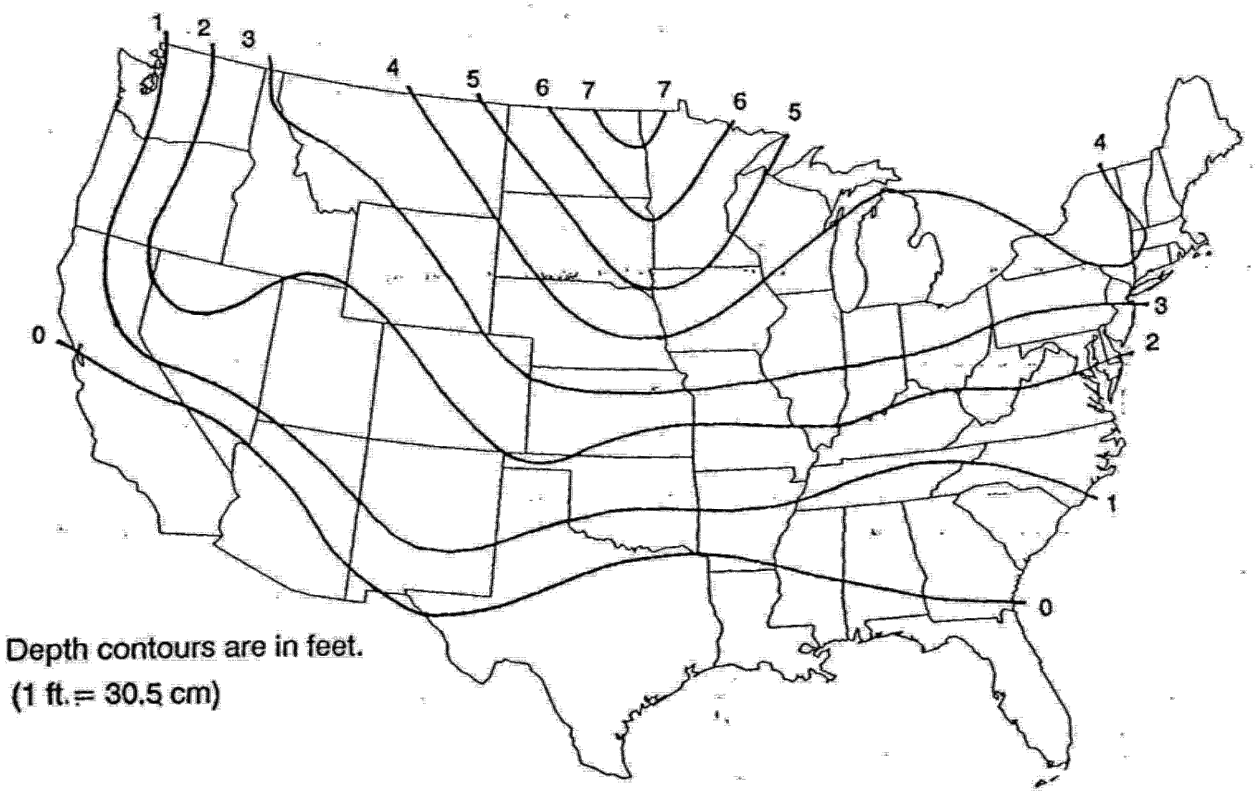
FIGURE I-1

GREENBELT II LANDFILL CLOSURE SCHEDULE



Notes:

1. If final grade of waste is reached in late fall or winter, closure will not begin until late spring or early summer.
2. A survey plat of the closed landfill will be submitted to the local land authority within 90 days after closure is complete.



MAXIMUM ANTICIPATED DEPTHS OF FREEZING

Source: "Design, Construction, and Operation of Hazardous and Non-hazardous Waste Surface Impoundments," EPA/530/SW-91/054.

TABLE 4:2 / POTENTIAL FROST ACTION OF UNIFIED SOIL CLASSIFICATION[4:13]

Soil Class	Potential Frost Action	Soil Class	Potential Frost Action
GW	None to very slight	ML	Medium to very high
GP	None to very slight	CL	Medium to high
GM	Slight to medium	OL	Medium to high
GC	Slight to medium	MH	Medium to high
SW	None to very slight	CH	Medium
SP	None to very slight	OH	Medium
SM	Slight to high	Pt	Slight
SC	Slight to high		

SOURCE: INTRODUCTORY SOIL MECHANICS & FOUNDATIONS, BY G. SOWERS AND G.F. SOWERS.

PREPARED FOR:

FROST ACTION MAP

UNITED STATES STEEL
MIDWEST PLANT
PORTAGE, IN

Weaver Consultants Group
CHICAGO, ILLINOIS
(312) 922-1030 www.wcgrp.com

DRAWN BY: RMD
REVIEWED BY: JK
DATE: 8/7/2023
FILE: 1146-301-01
CAD: SiteLayout.dwg

FIGURE I-2

APPENDIX I-1

Typical Sludge Data

See VFC Document # 83546904, pages 3154 – 3219

APPENDIX I-2

Settlement Calculations

See VFC Document # 83546904, pages 3220 – 3257

APPENDIX I-3

HELP Model Calculations

See VFC Document # 83546904, pages 3258 – 3296