



*Prepared for:*

Talen Energy  
835 Hamilton St., Suite 150  
Allentown, PA 18101

# **POST-CLOSURE PLAN**

**Per Requirements of 40 CFR §257.104**

## **Brunner Island SES Ash Landfill 8 East Manchester Township, Pennsylvania**

*Prepared by:*

**Geosyntec**   
consultants

10211 Wincopin Circle, Fourth Floor  
Columbia, Maryland 21044

Project Number ME1207A

October 2016

## TABLE OF CONTENTS

|       |   |   |
|-------|---|---|
| 1.    | INTRODUCTION .....  | 1 |
| 1.1   | Organization and Terms of Reference .....                                     | 1 |
| 1.2   | Site Location .....   | 1 |
| 1.3   | Landfill Description and Permit Status.....                                   | 1 |
| 2.    | CCR RULE REQUIREMENTS FOR WRITTEN POST-CLOSURE PLAN<br>(§257.104(D)) .....    | 3 |
| 2.1   | Written Post-Closure Plan (§257.104(d)) Requirements .....                    | 3 |
| 2.2   | Compliance with Post-Closure Care Requirements.....                           | 3 |
| 3.    | POST-CLOSURE PLAN.....  | 5 |
| 3.1   | Description and Frequency of Monitoring and Maintenance Activities.....       | 5 |
| 3.1.1 | Final Cover System Maintenance .....  | 5 |
| 3.1.2 | Leachate Collection and Removal System Maintenance .....                      | 5 |
| 3.1.3 | Groundwater Monitoring System Maintenance and Groundwater<br>Monitoring ..... | 6 |
| 3.2   | Post-Closure Period Contact Information.....                                  | 6 |
| 3.3   | Property Uses During Post-Closure Period .....                                | 6 |
| 4.    | CERTIFICATION BY QUALIFIED PROFESSIONAL ENGINEER .....                        | 7 |
| 5.    | REFERENCES .....  | 8 |

## LIST OF FIGURES

Figure 1 – Location Map

## LIST OF APPENDICES

Appendix A – Approved Closure Plan (Attachment 5 of PPL 2008a)

## 1. INTRODUCTION

### 1.1 Organization and Terms of Reference

Geosyntec Consultants (Geosyntec) has prepared this Post-Closure Plan for Talen Generation, LLC (Talen) to demonstrate compliance of the existing Brunner Island SES Ash Landfill 8 (Ash Landfill 8) in East Manchester Township, Pennsylvania with the post-closure care requirements of the Federal Coal Combustion Residuals (CCR) Rule. On 17 April 2015, the USEPA published the final rule for disposal of CCR from electric power utilities under Subtitle D of the Resource Conservation and Recovery Act (RCRA), contained in Section 257 of Title 40 of the Code of Federal Regulations (40 CFR 257 Subpart D), referred to here as the CCR Rule. Section 257.104 contains the requirements for conducting post-closure care of CCR landfills. In this Post-Closure Plan, the specific requirements of §257.104 are identified and addressed.

This Post-Closure Plan was prepared by Mr. Mike Nolden, E.I.T., and it was reviewed in accordance with Geosyntec's internal review policy by Mr. Michael Houlihan, P.E. and Mr. Thomas Ramsey, P.E., all of Geosyntec. Mr. Ramsey is a registered Professional Engineer in the Commonwealth of Pennsylvania.

### 1.2 Site Location

Ash Landfill 8 is located on Brunner Island, south of the Brunner Island Steam Electric Station (SES) located in East Manchester Township, York County, Pennsylvania. The site is shown on a United State Geological Survey 7.5-minute topographic map for the York Haven Quadrangle (Figure 1). Ash Landfill 8 is constructed on top of the closed CCR surface impoundment Ash Basin 5. Ash Landfill 8 and Ash Basin 5 are located adjacent to the Susquehanna River and south of the central portion of the power station.

### 1.3 Landfill Description and Permit Status

Ash Landfill 8, also called Disposal Area 8, is a CCR landfill constructed in 2008 to accept coal combustion residuals and other wastes produced by the Brunner Island SES, as described by in Form R of the Pennsylvania Department of Environmental Protection (PADEP) Class II Residual Waste Disposal Facility permit (PADEP Permit) application package (PPL 2008b). Ash Basin 5 was closed in 1987 (ERM 2007) and was neither impounding water nor receiving CCR on the effective date of the CCR Rule (i.e., 19 October 2015), and therefore is not regulated under the CCR Rule.

Ash Landfill 8 is regulated under the Pennsylvania Residual Waste Regulations of Title 25 PA Code, Chapters 287 and 288. The unit is permitted as a PADEP Class II Residual Waste Disposal Facility. Ash Landfill 8 was constructed and is operated under Permit No. 301354 for a Landfill—Class I, II, or III (PADEP 2008), which was issued in August 2008.

A closure plan (Appendix A), including provisions for post-closure care, was submitted to and approved by PADEP as part of the residual waste disposal permit. It is presented as Attachment 5 of the Design Package prepared by Civil and Environmental Consultants, Inc. and modified by

PPL (PPL 2008a), which is appended to the PADEP Permit application. The PADEP-approved closure plan is for closure in place. As such, the post-closure requirements of CCR Rule §257.104 are applicable.

## **2. CCR RULE REQUIREMENTS FOR WRITTEN POST-CLOSURE PLAN (§257.104(d))**

### **2.1 Written Post-Closure Plan (§257.104(d)) Requirements**

As described in §257.104(d) of the CCR Rule, a written post-closure plan must be prepared for Ash Landfill 8 that describes the activities to be performed as part of the post-closure care of the CCR unit. The written post-closure plan must include, at a minimum, the information specified in paragraphs (d)(1)(i) through (iii) of §257.104, including:

- (i) A description of the monitoring and maintenance activities required in paragraph (b) of this section for the CCR unit, and the frequency at which these activities will be performed;
- (ii) The name, address, telephone number, and email address of the person or office to contact about the facility during the post-closure care period; and
- (iii) A description of the planned uses of the property during the post-closure period. Post-closure uses of the property shall not disturb the integrity of the final cover, liner(s), or any other component of the containment system, or the function of the monitoring systems unless necessary to comply with the requirements in this subpart. Any other disturbance is allowed if the owner or operator of the CCR unit demonstrates that the disturbance of the final cover, liner, or other component of the containment system, including any removal of CCR, will not increase the potential threat to human health or the environment. The demonstration must be certified by a qualified professional engineer, and notification shall be provided to the State Director that the demonstration has been placed in the operating record and on the owner's or operator's publicly accessible Internet site.

In addition, the owner or operator of the CCR landfill must comply with the requirements of §257.104(d)(2), (3), and (4), which describe requirements for preparation, revision, and certification of the plan, as well as §257.104(e) and (f), which pertain to the notification of the conclusion of the post-closure period and recordkeeping requirements, respectively.

### **2.2 Compliance with Post-Closure Care Requirements**

Part 3 of this document presents the written post-closure plan required by the CCR Rule. The table below summarizes where the CCR Rule requirements of §257.104(d)(1) and (4) are addressed in this document.

| RULE SECTION        | RULE REQUIREMENT  | LOCATION WHERE ADDRESSED IN THIS DOCUMENT |
|---------------------|---|---|
| §257.104(d)(1)(i)   | Description and Frequency of Monitoring and Maintenance Activities Required by §257.104(b)                                    | Section 3.1                               |
| §257.104(d)(1)(ii)  | Post-Closure Period Contact Information   | Section 3.2                               |
| §257.104(d)(1)(iii) | Property Uses During Post-Closure Period  | Section 3.3                               |
| §257.104(d)(4)      | Written Certification from qualified professional engineer that initial Post-Closure Plan meets the requirements of §257.104. | Section 4                                 |

### **3. POST-CLOSURE PLAN**

#### **3.1 Description and Frequency of Monitoring and Maintenance Activities**

Per §257.104(d)(1)(i), this section provides a description of the monitoring and maintenance activities required in §257.104(b) and the frequency at which these activities are performed. Monitoring and maintenance activities to be performed during the post-closure period are described in Section 2.5 of the approved closure plan (Attachment 5 of PPL 2008a).

##### **3.1.1 Final Cover System Maintenance**

Section 257.104(b)(1) requires the owner or operator to maintain the integrity and effectiveness of the final cover system, including making repairs to the final cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover.

Following the closure of Ash Landfill 8, erosion and sedimentation control measures will be maintained in accordance with the approved erosion and sedimentation control plan until vegetated surfaces of the final cover system are fully stabilized (PPL 2008a).

Routine site inspections will be performed following the closure of Ash Landfill 8 to monitor the condition of the access roads, stormwater channels, and final cover (PPL 2008a). Routine inspections will be performed monthly for the first year following closure and quarterly thereafter. Routine inspections will also be performed following major storm events.

The final cover will be inspected as part of the routine site inspections described above (PPL 2008a). Eroded, non-vegetated, or otherwise damaged areas of the final cover will be repaired by the addition of soil, regrading, and revegetation, as necessary. Plans and a schedule for repair will be prepared for necessary corrective action (PPL 2008a).

The run-on and run-off control features of are described in the Ash Landfill 8 Run-On and Run-Off Control System Plan (Geosyntec 2016b) and the approved stormwater management plan (Attachment 1.7 of PPL 2008a). The run-on and run-off control system is designed and constructed to minimize erosion and other damage to the final cover. As shown in the Ash Landfill 8 Closure Plan (Geosyntec 2016a), the run-on and run-off control system is expected to maintain its effectiveness following closure and settlement of Ash Landfill 8.

##### **3.1.2 Leachate Collection and Removal System Maintenance**

Section 257.104(b)(2) requires the owner or operator to maintain the integrity and effectiveness of the leachate collection and removal system and operate the leachate collection and removal system in accordance with the requirements of §257.70.

Following the closure of Ash Landfill 8, leachate will continue to be managed throughout the post-closure period (PPL 2008a).

### **3.1.3 Groundwater Monitoring System Maintenance and Groundwater Monitoring**

Section 257.104(b)(3) requires the owner or operator to maintain the groundwater monitoring system and monitor the groundwater in accordance with the requirements of §§257.90 through 257.98.

As required by §257.90(b)(1), prior to the 17 October 2017 deadline, Talen will install a groundwater monitoring system, develop a sampling and analysis program, initiate a detection monitoring program, and begin evaluating groundwater monitoring data in accordance with §§257.91, 257.93, and 257.94. During the post-closure period, groundwater monitoring, and system maintenance, as necessary, will continue semiannually under the established program as required by §257.94(b). The monitoring will likely be performed in coincidence with the quarterly groundwater sampling events required by PADEP.

Transition to an assessment monitoring program and selection and implementation of corrective measures will be performed in accordance with §§257.95 through 257.98, if necessary.

### **3.2 Post-Closure Period Contact Information**

Per §257.104(d)(1)(ii), this section provides the name, address, telephone number, and email address of the person or office to contact about the facility during the post-closure care period.

Day-to-day access to Ash Landfill 8 is controlled by the Brunner Island SES facility personnel. Facility personnel can be reached using the contact information below.

Thomas Hickes  
Plant Manager – Fossil Generation  
Brunner Island, LLC  
1400 Wago Road  
Mt. Wolf, PA 17347  
Telephone: 717-266-7510  
[Thomas.hickes@talenergy.com](mailto:Thomas.hickes@talenergy.com)

### **3.3 Property Uses During Post-Closure Period**

Per §257.104(d)(1)(iii), this section describes the planned uses of the property during the post-closure period. The post-closure uses of the property during the post-closure period are described in Section 3.0 of the approved closure plan (Attachment 5 of PPL 2008a).

Following the closure of Ash landfill 8, the property will be maintained as grassland or open pasture (PPL 2008a). The planned use of the property during the post-closure period is not expected to disturb the integrity or effectiveness of any portion of the containment system. As such, no further demonstration or certification is required under §257.104(d)(1)(iii).



#### 4. CERTIFICATION BY QUALIFIED PROFESSIONAL ENGINEER

Per §257.104(d)(4), the owner or operator of the unit must obtain a written certification from a qualified professional engineer that the written post-closure plan meets the requirements of the CCR Rule.

##### Certification for Written Post-Closure Plan

CCR Unit: Brunner Island SES Ash Landfill 8

##### Certification

I, Thomas B. Ramsey, a registered professional engineer in the Commonwealth of Pennsylvania certify that the Written Post-Closure Plan for the Brunner Island SES Ash Landfill 8 is in compliance with requirements of 40 CFR §257.104(d). This certification is based on my review of information described in this certification report.

Printed Name Thomas B. Ramsey

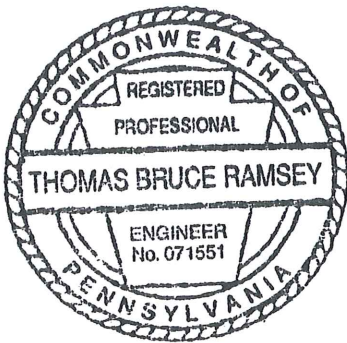
PE License Number PA071551

State Pennsylvania

Signature 

Date 12 OCT 2016

Seal

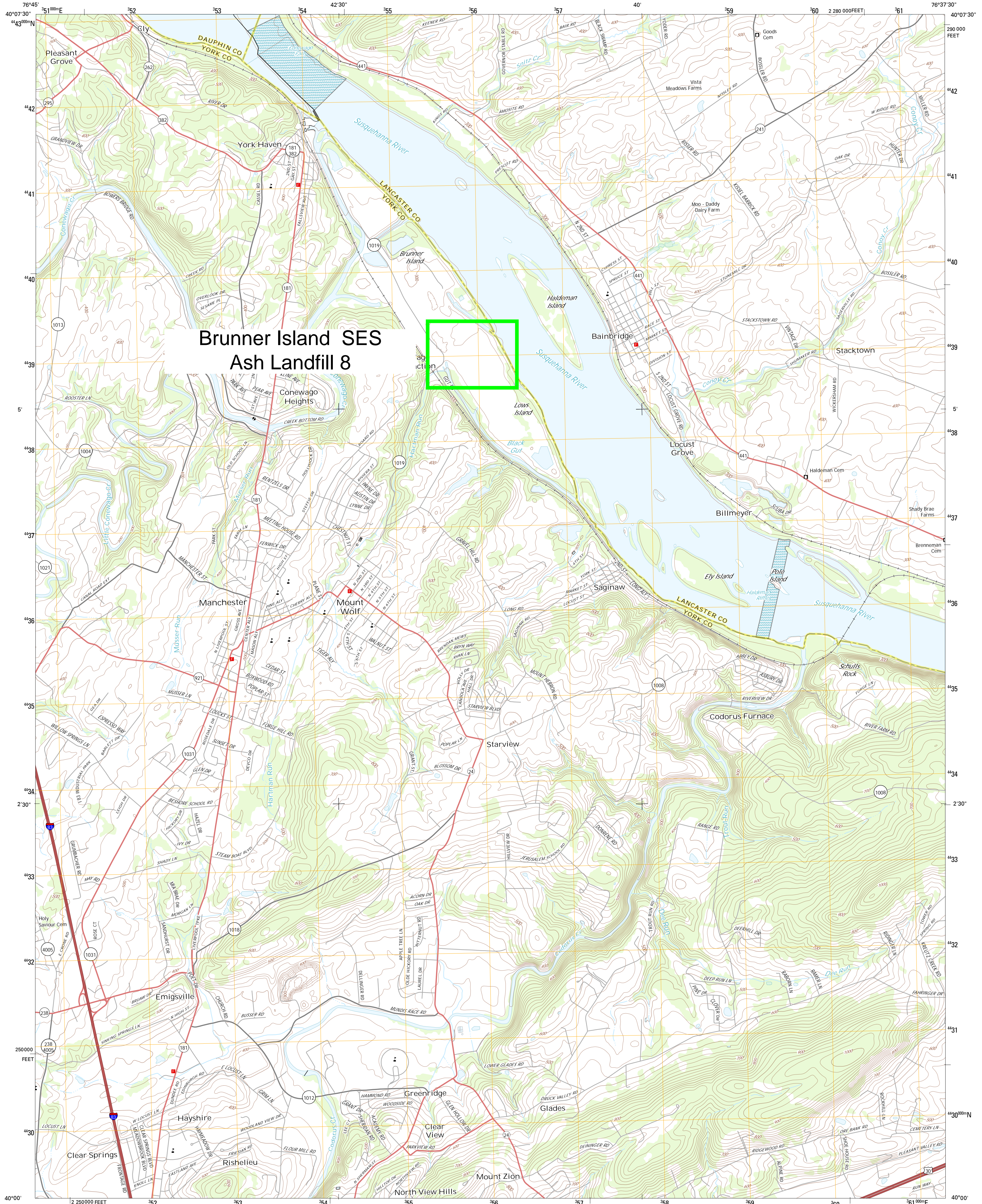


## 5. REFERENCES

- ERM (2007). “Technical Memorandum: Flood Impact on Ash Basin 4, 5, 6, and 7 Dikes Study – Brunner Island Station.” Environmental Resource Management. October 2007.
- Geosyntec (2016a). “Closure Plan Per Requirements of 40 CFR §257.102; Brunner Island SES Ash Landfill 8.” Geosyntec Consultants. August 2016.
- Geosyntec (2016b). “Run-On and Run-Off Control Per Requirements of 40 CFR §257.81; Brunner Island SES Ash Landfill 8.” Geosyntec Consultants. August 2016.
- PADEP (2008). “Permit for Solid Waste Disposal and/or Processing Unit; Permit No. 301354.” Pennsylvania Department of Environmental Protection, Waste Management Division, Southcentral Region. Harrisburg, PA.
- PPL (2008a). “Disposal Areas 8 Class II Residual Waste Disposal Facility Landfill Design Package and Plans.” Volumes 1 & 2. PPL Generation, LLC. January 2008.
- PPL (2008b). “Disposal Area 8 Class II Residual Waste Disposal Facility Permit Application Forms.” PPL Generation, LLC. January 2008.
- United States Environmental Protection Agency (USEPA) (2015). “Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule.” Title 40 Code of Federal Regulations, Parts 257 and 261.

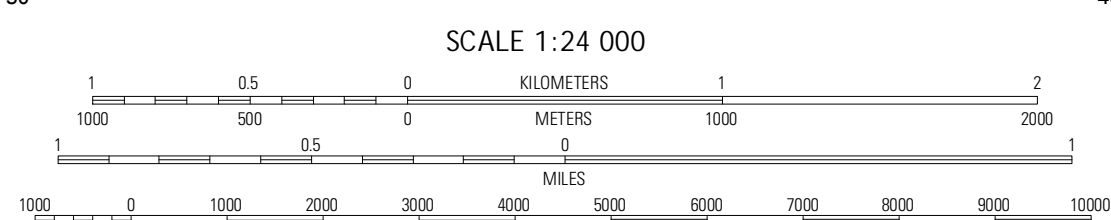
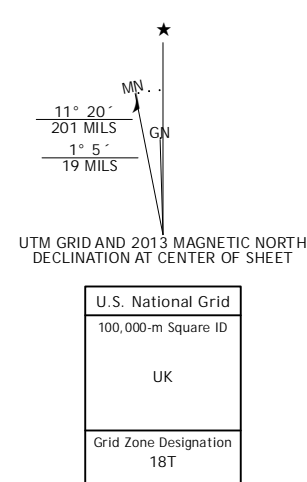
## **FIGURES**





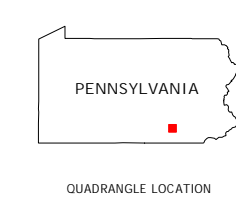
Produced by the United States Geological Survey  
North American Datum of 1983 (NAD83)  
World Geodetic System of 1984 (WGS84). Projection and  
1000-meter grid: Universal Transverse Mercator, Zone 18T  
10 000-foot ticks: Pennsylvania Coordinate System of 1983  
(south zone)

Imagery..... N/AIP, July 2010  
Roads..... ©2006-2012 TomTom  
Names..... GNS, 2013  
Hydrography..... National Hydrography Dataset, 2010  
Contours..... National Elevation Dataset, 2002  
Boundaries..... Census, IBC, USGS, 1972 - 2012



CONTOUR INTERVAL 20 FEET  
NORTH AMERICAN VERTICAL DATUM OF 1988

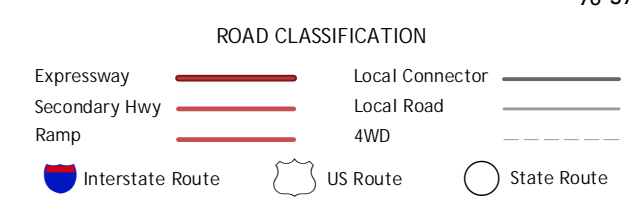
**Figure 1**  
**Unit Location Map**



QUADRANGLE LOCATION

|           |            |               |
|-----------|------------|---------------|
| Steeleton | Middletown | Elizabethtown |
| Dover     | York Haven | Columbia West |
| West York | York       | Red Lion      |

ADJOINING 7.5' QUADRANGLES



YORK HAVEN, PA  
2013



## **APPENDIX A**

Approved Closure Plan (Attachment 5 of PPL 2008a)

**DISPOSAL AREA 8  
CLASS II RESIDUAL WASTE DISPOSAL FACILITY  
CLOSURE PLAN**

**PPL GENERATION, LLC  
BRUNNER ISLAND STEAM ELECTRIC STATION  
EAST MANCHESTER TOWNSHIP, YORK COUNTY, PENNSYLVANIA**

**Prepared for:**

**PPL GENERATION, LLC  
TWO NORTH NINTH STREET, PLAZA 6  
ALLENTOWN, PENNSYLVANIA 18101-1179**

**Prepared by:**

**CIVIL & ENVIRONMENTAL CONSULTANTS, INC.  
333 BALDWIN ROAD  
PITTSBURGH, PENNSYLVANIA 15205**

**CEC Project 060-338**

**JANUARY, 2008**

**TABLE OF CONTENTS**

**PPL GENERATION, LLC  
BRUNNER ISLAND STEAM ELECTRIC STATION  
DISPOSAL AREA 8  
CLOSURE PLAN**

|  | <u>Page</u> |
|--|-------------|
| Section 1.0 Introduction.....  | 1           |
| Section 2.0 Narrative Addressing Form 18R, Section B. Closure Plan .....               | 1           |
| Section 3.0 Narrative Addressing Form 18R, Section C. Post-Closure Land Use Plan ..... | 4           |

**EXHIBITS**

EXHIBIT 1 Bonding Worksheets

**PPL GENERATION, LLC  
BRUNNER ISLAND STEAM ELECTRIC STATION  
DISPOSAL AREA 8**

**CLOSURE PLAN**

1.0 INTRODUCTION

This Closure Plan is for Disposal Area 8 at the PPL Generation, LLC, Brunner Island Steam Electric Station. The site is located in East Manchester Township, York County, on the west shore of the Susquehanna River. Disposal Area 8 is located over the previously filled and retired ash impoundment "Basin 5," where sluiced ash was disposed. Basin 5 was filled with approximately 35 to 40 feet of ash. Area 8 covers approximately 19 acres and will be used for residual waste disposal. The top of the landfill will be at approximately elevation 380 feet, which is 90 feet above the surface of Basin 5.

Disposal Area 8 will be developed in three phases as presented by the permit drawings. Consequently, closure of Area 8 will be performed in three phases and it will be performed after each phase is filled to capacity.

Pennsylvania residual waste Form 18R "Closure/Post-Closure Land Use Plan" was used as a reference during the development of this plan. Sections and subsections listed by Form 18R are referenced below followed by a narrative to address the issue.

2.0 Narrative Addressing Form 18R, Section B. Closure Plan

2.1 Plan for decontamination and removal of equipment, structures and related materials from the facility (Reference – Form 18R Section B.1).

Due to the characteristics of the waste, equipment used to handle the waste will be cleaned by manually removing waste buildup. Then, the equipment will be washed with water under high pressure within the limits of the disposal area or in a location where rinse water will be properly handled. Similar methods will be applied to structures and related materials.

2.2 An estimate of the year in which final closure will occur, including an explanation of the basis for the estimate (Reference – Form 18R Section B.2).

Waste to be disposed in Area 8 is projected to be generated at approximately 41,700 cubic yards per year (115 cubic yards per day). Based on this rate, the following table (copied here from the Attachment 3 - Operations and Maintenance Plan) presents the site's projected filling schedule:



**CLOSURE PLAN  
(Continued)**

| CELL DESIGNATION | DISPOSAL CAPACITY (cy) | ACTIVE LIFE |
|------------------|------------------------|-------------|
| Cell 1           | 400,000                | 9.6 years   |
| Cell 2           | 475,000                | 11.4 years  |
| Cell 3           | 534,000                | 12.8 years  |
| Total            | 1,409,000              | 33.8 years  |

Assuming that filling commences in 2008 within Cell 1 of Area 8 and considering the projected site life information in the table, the disposal area is projected to fill to capacity some time in 2041.

2.3 If the facility will close in stages, a description of how and when the facility will begin and implement partial closure (Reference – Form 18R Section B.3)

Area 8 will be developed in three phases, where each phase will generally be filled to capacity as the next phase is developed and used for disposal. Once the previous phase is filled to capacity, areas within the phase that are filled to final waste grade will be closed. The limit of closure will be set near the phase limit and will encompass the maximum area on the phase that can reasonably be closed while following good engineering and constructability practices.

Phasing drawings F016, F017, and F018 graphically present the phased development and closure of Area 8, and Section 2.0 “Site Development” in the Construction Plan provides a narrative description of the phased development and closure.

2.4 A description of the steps necessary for closure if the facility closes prematurely.

As noted above, Area 8 will be developed and closed in three phases. As presented on the phasing drawings, the phases have been designed so that during development and filling stormwater management structures on the landfill will be connected to permanent stormwater management structures. If the facility needs to be prematurely closed, unless a design is needed to address field conditions at that time, the operator will implement the following:

- Grade slopes in active areas to blend into adjacent contours and promote positive stormwater drainage to permanent stormwater management structures;
- Perform closure by placing final cover on all disposal areas not previously closed;
- Grade areas outside of the disposal footprint to be free draining to prevent water ponding;
- Revegetate all disturbed areas within and outside the landfill footprint; and
- Perform all other closure activities as planned.

2.5 A narrative description, including a schedule, of measures that are proposed to be carried out after closure at the facility

## CLOSURE PLAN (Continued)

Several measures are proposed following closure at the facility. These measures are described below:

- a. Water Quality Monitoring - Groundwater quality monitoring will continue on a quarterly basis following facility closure for the entire post-closure period (30 years), as required by regulation.
- b. Gas Control and Monitoring – Due to the nature of the waste that will be disposed at this facility, it does not generate landfill gas. Consequently, neither landfill gas control nor landfill gas monitoring is necessary.
- c. Leachate Collection, Treatment, and Pumping – Leachate management will be performed through the post-closure period of the landfill, or until such time that leachate is no longer generated by the landfill.
- d. Erosion and Sedimentation Control – The erosion and sedimentation controls will be used during closure until all surfaces are finally stabilized. They will be maintained as described by the Erosion & Sedimentation Control Plan in Attachment 4 and as shown on the drawings.
- e. Revegetation Including Maintenance of the Final Cover – The final cover will be monitored during routine site inspections (see Item g below that defines “routine site inspections”) and after heavy rains. Areas encountered that require maintenance due to erosion, equipment damage, or vegetation mortality will be repaired. Repairs may include soil addition to repair erosion damage, regrading, and revegetation (i.e., application of seed, mulch, fertilizer and any soil amendments needed).
- f. Access Control – The disposal area is located within the Plant’s property, and access to the disposal area is controlled by gates controlling access to the Plant. No change to the Plant’s access is anticipated following closure of Area 8.
- g. Other Maintenance Activities – Routine site inspections will be performed on a monthly basis for the first year following closure. Every year thereafter, Routine site inspections will be performed on a quarterly basis and after major storm events. Maintenance plans and a reasonable schedule to complete the work will be prepared for any corrective action needed with respect to maintenance needed for the site’s access roads, channels, or final cover.

### 2.6 Description of means by which funds will be made available to cover cost of post-closure operations.

The facility will secure a bond based on the bond amount determined by Pennsylvania’s standard bonding worksheets. The bond will be secured once the bond amount is accepted as part of the

**CLOSURE PLAN  
(Continued)**

issuance of a permit for Area 8. The attached bonding worksheets are based on the proposed design and current regulatory requirements.

- 2.7 Name, address, and telephone number at which the operator can be reached during the post-closure period.

PPL Generation, LLC, Brunner Island Steam Electric Station operates 7 days per week, 24 hours per day. Facility personnel can be reached with the following contact information:

Steven Marbaise – Manager – Fossil Generation Assets  
Telephone – 717-266-7510  
Fax – 717-266-7519

- 3.0 Narrative Addressing Form 18R, Section C. Post-Closure Land Use Plan

- 3.1 How the proposed post-closure land use is to be achieved and the necessary support activities which may be needed to achieve the proposed land use.

The intended post-closure land use plan is for the area to serve as grassland or open pasture. Area 8, any future expansions of Area 8, and portions of the retired ash impoundment “Basin 5” disturbed during the development and operation of Area 8 will be revegetated according to the erosion and sedimentation control plan with ground cover to achieve this final land use.

- 3.2 The consideration which has been given to making the proposed post-closure land use consistent with landowner plans and applicable State and local land use plans and programs

Following the proposed land use, this land will not be capable of supporting other uses beyond grassland or open pasture. Since it is located within the property for the existing power generation station, this post-closure land use is consistent with the landowner plans. This proposed post-closure land use is in-line with land use policies or plans for this area.

---

**EXHIBIT 1**

**BONDING WORKSHEETS**

---

**BONDING WORKSHEETS  
FOR  
Landfills and Disposal Impoundments**

Revised August 30, 2001



COMMONWEALTH OF PENNSYLVANIA  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

**General Information**

**Permits:** Please list all permits, approvals, licenses, registrations, other bonds, etc. for this facility.

| I.D.# <sup>1</sup> | Authority <sup>2</sup> | Summary <sup>3</sup> |
|--------------------|------------------------|----------------------|
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |
|                    |                        |                      |

1. List the permit I.D. number, registration number, etc. If there is no number, put in "none".  
 2. List the issuing authority's name, address and telephone number  
 3. List any closure features or monitoring requirements. As examples: For storage tanks, list the number, type and size of tanks. For NPDES permits list the number of outfalls to be monitored and ponds/plants to be maintained and/or closed.

Date Prepared

May 24, 2007

COMMONWEALTH OF PENNSYLVANIA  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

I.D. Number

**BONDING WORKSHEET A  
 DECONTAMINATING THE FACILITY**

Project Summary<sup>1</sup>:

The PPL Brunner Island, LLC Area 8 disposal area will be a captive residual waste landfill located in East Manchester Township, York County, Pennsylvania. Since it is a captive facility that shares equipment with the electric generating station on the same property, no equipment will be removed at closure. Therefore, no decontamination will be required as part of facility closure.

- |  |            |
|--|------------|
| 1. Maximum volume of solid waste required to be moved or disposed as part of closure (includes cost for solidification).   | 0 _____    |
| 2. Estimated volume of contaminated soils or materials (from accidents, spills, prior remediations).   | 0 _____    |
| 3. Total volume of waste (line 1 + line 2).  | 0 _____    |
| 4. Unit cost to dispose off-site (include any analyses or transportation cost).  | N/A _____  |
| 5. Total cost to dispose of waste (line 3 x line 4).   | N/A _____  |
| 6. Estimated volume of contaminated liquid generated during decontamination.   | 0 _____    |
| 7. Unit cost to treat/dispose of contaminated liquids (including any transportation)   | N/A _____  |
| 8. Total cost to dispose of contaminated liquids (line 6 x line 7).  | N/A _____  |
| 9. Estimated volume of fill material   | 0 _____    |
| 10. Unit cost of acquiring, transporting, placing and stabilizing (i.e. revegetating) fill material (include costs for off-site purchase if soil not available on-site). | N/A _____  |
| 11. Total cost to fill (line 9 x line 10).   | N/A _____  |
| 12. Equipment decontamination cost   | 0 _____ LS |

**Total cost – all Worksheet A**

**\$ \_\_\_\_\_ 0**  
 (Put final total on summary cost sheet – line 1)

<sup>1</sup> List the areas/equipment that will need to be decontaminated and include any assumptions made. Multiple sheets should be used to estimate the costs for different areas.



Civil & Environmental Consultants, Inc.

PROJECT PPL GEN., LLC, BRUNNER ISLAND STEAM

PROJECT NO. 060338.002

Bonding Worksheet A, Decontaminating the Facility

PAGE 1 OF 1

MADE BY GDT

DATE 05/24/07

CHECKED BY [Signature]

DATE 5-25-07

**CALCULATION BRIEF  
BONDING WORKSHEET A  
DECONTAMINATING THE FACILITY  
AREA 8**

**OBJECTIVE:** Determine the total bond amount required for the decontamination of the facility at the time of closure.

**METHODOLOGY:** Estimate material quantities and disposal costs associated with decontamination of the Area 8 during closure, as required in DEP Bonding Worksheet A.

**LINE ITEM ASSUMPTIONS AND CALCULATIONS:**

1. Onsite wastes to be managed during closure and final-closure will be placed in the landfill and incorporated into the waste prior to final-closure is completed. Therefore, no offsite disposal is anticipated at the time of final-closure.
6. Due to the characteristics of the waste, equipment used to handle the waste will be cleaned by manually removing waste buildup. Then, the equipment will be washed with water under high pressure within the limits of the disposal area or in a location where rinse water will be properly handled (i.e., discharged into the site's waste water management system. Consequently, there is no cost associated with wash water handling.



Date Prepared

May 24, 2007

COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

I.D. Number

[Empty box for I.D. Number]

**BONDING WORKSHEET B  
CAP AND FINAL COVER PLACEMENT**

**How do I start?** Select a likely "worst case" scenario where you would have a maximum amount of the facility open and in need of closure. Provide a description of the scenario with references to site development stages.

My approved cap and final cover design consists of (top to bottom):

24 inches (min.) of final cover soil  
Drainage geocomposite (HDPE geonet with 6 oz/sy nonwoven geotextile heat-bonded to both sides)  
40-mil textured flexible geomembrane  
Acceptable soil surface

- 1. Volume of fill required for area not at final/intermediate grade, but would require filling prior to capping: \_\_\_\_\_ 0 CY
- 2. Maximum area to be capped and covered (this should include all areas at final grade and not capped, intermediate grades and areas to be filled to get to intermediate grades then capped): \_\_\_\_\_ 9.2 acres
- 3. Closure design, surveying and development of construction drawings (use \$750.00/acre of number 2). \$ \_\_\_\_\_ \$15,000
  - a. Construction and maintenance of access roads. \$ \_\_\_\_\_ \$5,000LS

**Material Volumes/Areas:**

- 4. Earthen Materials
  - a. Structural Fill \_\_\_\_\_ 0 CY (Specification<sup>1</sup>) \_\_\_\_\_
  - b. Intermediate Cover \_\_\_\_\_ 0 CY (Specification<sup>1</sup>) \_\_\_\_\_
  - c. Clay Cap Material \_\_\_\_\_ 0 CY (Specification<sup>1</sup>) \_\_\_\_\_
  - d. Final Cover Soil \_\_\_\_\_ 30,000 CY (Specification<sup>1</sup>) \_\_\_\_\_
  - e. Sand/Stone \_\_\_\_\_ 402 SY (Specification<sup>1</sup>) Channel Lining (Rip Rap)
  - f. Other \_\_\_\_\_ 640 Ton (Specification<sup>1</sup>) Access Road
- 5. Synthetic Materials
  - a. Geotextile \_\_\_\_\_ 0 Sq.Ft. (Type) \_\_\_\_\_
  - b. FML \_\_\_\_\_ 400,800 Sq.Ft. (Type) \_\_\_\_\_
  - c. Drainage Layer \_\_\_\_\_ 400,800 Sq.Ft. (Type) \_\_\_\_\_
  - d. Other \_\_\_\_\_ 0 Sq.Ft. (Type) \_\_\_\_\_
- 6. Cap Penetrations: Estimate the number of cap penetrations that will need to be installed for closure of the facility including, but not limited to gas extraction wells, cleanouts, valve pits, etc. \_\_\_\_\_ 0

<sup>1</sup> Provide a brief description of the material specification (i.e. ¾" minus, 12" minus - 12" lifts, etc.)

**Material Unit Costs:**

7. Unit cost to place or regrade material to reach final grades (this may include additional waste placement to reach grade) 0 \$/CY

Are sufficient soils available in permitted on-site borrow areas to complete job?  
(Attach maps that identify sources and stockpiles) No

8. Earthen Materials

a. Structural Fill

| Stockpile                | Borrow                   | Onsite                   | Offsite                  | Processing Req'd         |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|                          |                          |                          |                          | Yes                      | No                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Unit cost to place<sup>2</sup> N/A \$/CY

b. Intermediate Cover

|                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|

Unit cost to place<sup>2</sup> N/A \$/CY

c. Clay Cap Material

|                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|

Unit cost to place<sup>2</sup> N/A \$/CY

d. Final Cover Soil

|                                     |                          |                          |                                     |                          |                                     |
|-------------------------------------|--------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|-------------------------------------|--------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|

Unit cost to place<sup>2</sup> \$13.25/cy \$/CY

e. Sand/Stone

|                          |                          |                          |                                     |                          |                                     |
|--------------------------|--------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|--------------------------|--------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|

Unit cost to place<sup>2</sup> \$84/SY (means) \$/SY

f. Other – Access Road Aggregate

|                          |                          |                          |                                     |                          |                                     |
|--------------------------|--------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|--------------------------|--------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|

Unit cost to place<sup>2</sup> \$22.50/ton \$/ton

9. Synthetic Materials

a. Geotextile

Unit cost to place<sup>3</sup> N/A \$/sq. ft.

b. FML

Unit cost to place<sup>3</sup> \$0.58/sf \$/sq. ft.

c. Drainage Layer

Unit cost to place<sup>3</sup> \$0.70/sf \$/sq. ft.

d. Other

Unit cost to place<sup>3</sup> N/A \$/sq. ft.

<sup>2</sup> The unit costs should include all associated costs including, but not limited to cost of material, excavation, transportation, processing and placement.

<sup>3</sup> The unit price should include the material cost, transportation cost, handling cost and installation cost.

## 10. Cap Penetration Unit Cost

List the unit cost to fabricate and install each cap penetration

Unit cost to place

N/A

\$/each

11. Unit cost to construct E & S structures  
(i.e. channels, letdowns, etc.)N/A \$/acre

## 12. Revegetation Cost

(Seeding rate used: \_\_\_\_\_ lbs/acre)

(Lime rate used: \_\_\_\_\_ tons/acre)

(Fertilizer rate used: \_\_\_\_\_ tons/acre)

(Mulch rate used: \_\_\_\_\_ tons/acre)

Unit cost to revegetate<sup>3</sup>\$2,760/ac

\$/acre

## 13. Cost Summary

|   |                 |                    |
|---|-----------------|--------------------|
| a. Fill (line 1 x line 7)                 | \$ _____        | \$0                |
| b. Construction Drawings (line 3)         | \$ _____        | \$15,000           |
| c. Construction Roads (line 3a)           | \$ _____        | \$5,000            |
| d. Structural Fill (line 4a x line 8a)    | \$ _____        | \$0                |
| e. Intermediate Cover (line 4b x line 8b) | \$ _____        | \$0                |
| f. Clay Cap Material (line 4c x line 8c)  | \$ _____        | \$0                |
| g. Final Cover (line 4d x line 8d)        | \$ _____        | \$397,500          |
| h. Sand/Stone (line 4e x line 8e)         | \$ _____        | \$33,800           |
| i. Other (line 4f x line 8f)              | \$ _____        | \$14,400           |
| j. Geotextile (line 5a x line 9a)         | \$ _____        | \$0                |
| k. FML (line 5b x line 9b)                | \$ _____        | \$232,500          |
| l. Drainage Layer (line 5c x line 9c)     | \$ _____        | \$280,600          |
| m. Other (line 5d x line 9d)              | \$ _____        | \$0                |
| n. Penetrations (line 6 x line 10)        | \$ _____        | \$0                |
| o. E & S Structures (line 2 x line 11)    | \$ _____        | \$0                |
| p. Revegetation (line 12 x line 2)        | \$ _____        | \$25,400           |
| <b>Subtotal</b>                           | <b>\$ _____</b> | <b>\$1,381,700</b> |
| CQA costs (use 5% of subtotal)            | \$ _____        | \$69,100           |

**Total** \$ \$1,450,800

(Place this total on Summary Cost Worksheet – line 2)



Civil & Environmental Consultants, Inc.

PROJECT PPL GEN., LLC, BRUNNER ISLAND STEAM

PROJECT NO. 060338.002

Bonding Worksheet B, Cap and Final Cover Placement

PAGE 1 OF 3

MADE BY GDT

DATE 05/24/07

CHECKED BY [Signature]

DATE 05-25-07

**CALCULATION BRIEF  
BONDING WORKSHEET B  
CAP AND FINAL COVER PLACEMENT  
AREA 8**

**OBJECTIVE:** Determine the total bond amount required for cap and final cover placement during closure under worst case conditions.

**METHODOLOGY:** Estimate material quantities and installation costs associated with cap and final cover placement on Area 8, as required in PaDEP Bonding Worksheet B.

**ASSUMPTIONS:**

1. The "worst case" scenario for closure is based on Cell 1 (the largest disposal cell) being constructed, having received waste, and closing prematurely. The maximum amount of open area that would need to be closed would be approximately 9.2 acres (the Cell 1 footprint).
2. The proposed cap and final cover design will consist of from top to bottom):
  - 24 inches (min.) final cover soil;
  - Drainage composite (HDPE geonet with 6oz/sy nonwoven geotextile heat-bonded to both sides);
  - 40-mil textured flexible geomembrane; and
  - Acceptable soil surface.

Refer to the design drawings for a detail of the final cover system.

**LINE ITEM ASSUMPTIONS AND CALCULATIONS:**

1. It is assumed that there will be no fill required for areas not at final/intermediate grade.
2. See Assumption No. 1 (9.2 acres).
- 4a. No structural fill placement is anticipated.
- 4b. No intermediate cover soil will be placed.
- 4c. No clay soil is included in the proposed cap cross section design.



Civil & Environmental Consultants, Inc.

PROJECT PPL GEN., LLC, BRUNNER ISLAND STEAM  
Bonding Worksheet B, Cap and Final Cover Placement

PROJECT NO. 060338.002  
PAGE 2 OF 3

MADE BY GDT DATE 05/24/07 CHECKED BY B DATE 05-25-07

- 4d. Final cover soil will be placed over the entire area.

$$V_{FC} = (9.2 \text{ ac}) * (43,560 \text{ sf/ac}) * (2 \text{ ft}) * (1 \text{ cy}/27 \text{ cf})$$
$$\underline{V_{FC} = 30,000 \text{ cy}}$$

- 4e. The estimated stone quantity is based on the material needed for stone (Riprap) lined channels.

$$\underline{A_{STONE} = 402 \text{ SY}}$$

- 4f. This item includes the estimated aggregate needed for the permanent access road into the landfill.

$$\underline{W_{AGGREGATE} = 640 \text{ TONS}}$$

5. Synthetic material quantities were calculated for the entire 50 acre area to be closed in accordance with the cap and final cover system.

$$A = (9.2 \text{ ac}) * (43,560 \text{ sf/ac})$$
$$\underline{A = 400,800 \text{ sf}}$$

6. Due to the nature of the waste a LFG collection system, including wells and cleanouts is not required.

7. There should be no additional placement/regrading to reach final grade.

- 8d. Only final cover soil will be needed in the cap, which will be purchased from an off-site vendor. The costs to purchase and place the final cover are based on similar prevailing wage projects. The cost for purchase and placement of final cover soil are as follows:

Purchase, Delivery, and Stockpiling on Site of Final Cover Soil = \$10.00/cy  
Excavation from Stockpile, Hauling, and Placement of Final Cover Soil = \$3.25/cy  
Total Cost for Final Cover Soil = \$13.25/cy

- 8e. The unit cost to supply and place riprap is \$84/sy based on the 2007 Means (Heavy Construction Cost Data).



Civil & Environmental Consultants, Inc.

PROJECT PPL GEN., LLC, BRUNNER ISLAND STEAM

PROJECT NO. 060338.002

Bonding Worksheet B, Cap and Final Cover Placement

PAGE 3 OF 3

MADE BY GDT DATE 05/24/07

CHECKED BY [Signature] DATE 05-25-07

- 8f. The unit cost to supply and place access road aggregate is \$22.50/TON based on the 2007 Means (Heavy Construction Cost Data).
- 9. The synthetic material unit installation costs are based on similar prevailing wage projects.
- 10. Not Applicable
- 11. It is assumed that all of the benches have been constructed at the time of closure of the facility. All other erosion and sedimentation control structures already exist at the site.
- 12. Revegetation costs are estimated are based on similar prevailing wage projects. Seeding with the permitted seed mix, fertilizer, and mulch rates is included in the cost estimate.

Revegetation cost = Seeding, Fertilizer, Mulch application

Revegetation cost = \$2,760/ac

Date Prepared

COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

I.D. Number

## BONDING WORKSHEET C GROUNDWATER MONITORING SYSTEM

1. Number of wells in the approved monitoring plan. \_\_\_\_\_
  - a. Shallowest well depth \_\_\_\_\_ ft.
  - b. Deepest well depth \_\_\_\_\_ ft.
  - c. Average well depth \_\_\_\_\_ ft.
  - d. Number with dedicated pumps \_\_\_\_\_
  
2. Unit cost to upgrade an existing well with a dedicated pump \_\_\_\_\_ \$/well
3. Unit cost to install a well (assume average well depth, and include drilling, installation, developing and pump installation) \_\_\_\_\_ \$/well
4. Number of wells to be installed (wells in the approved plan that haven't been installed) \_\_\_\_\_
5. Number of wells to be replaced over the life of the monitoring period (use 10% of line 1 and round up) \_\_\_\_\_
6. Number of pumps to be replaced/repared (use 25% of line 1 over the monitoring period) \_\_\_\_\_
7. Unit cost to purge and sample a well (assume average well depth, and include methane monitoring, record keeping and shipping) \_\_\_\_\_ \$/well
8. Unit cost to analyze sample(s)
  - a. Quarterly  
(25 PA Code §273.284, §277.284 or §288.254) \_\_\_\_\_ \$/well
  - b. Annually (25 PA Code §273.284, §277.284 or §288.254) \_\_\_\_\_ \$/well
9. Unit cost to analyze data (includes review of lab QA/QC data, database input, form completion, statistical analysis and data review) \_\_\_\_\_ \$/well
10. Cost to purge, sample and analyze – quarterly  
(line 7 + line 8a + line 9) \_\_\_\_\_ \$/well
11. Cost to purge, sample and analyze – annually  
(line 7 + line 8b + line 9) \_\_\_\_\_ \$/well
12. Number of years of sampling (30 + time to close) \_\_\_\_\_ years

13. Cost Summary –Groundwater Monitoring System

- a. System upgrade ([line 1 – line 1d] x line 2) \$ \_\_\_\_\_
  - b. Wells to be Installed (line 3 x line 4) \$ \_\_\_\_\_
  - c. Wells to be replaced (line 3 x line 5) \$ \_\_\_\_\_
  - d. Pumps to be replaced (line 2 x line 6) \$ \_\_\_\_\_
  - e. Cost of Quarterly Monitoring  
(line 1 x "4" x line 10 x line 12) \$ \_\_\_\_\_
  - f. Cost of Annual Monitoring  
(line 1 x line 11 x line 12) \$ \_\_\_\_\_
- Subtotal** \$ \_\_\_\_\_

Adjustment for resampling, assessments, etc.

- a. Use 0% of subtotal if no assessments in last 2 yrs.
- b. Use 5% of subtotal if assessment in last 2 yrs.
- c. Use 10% if currently in assessment, abatement or increase monitoring \$ \_\_\_\_\_

**Total** \$ \_\_\_\_\_

(Place this total on Summary Cost Worksheet – line 3)



Date Prepared

COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

I.D. Number

## BONDING WORKSHEET D SURFACE WATER MONITORING

### Solid Waste Surface Water Sampling

1. Number of surface points monitored for Solid Waste Permit \_\_\_\_\_
2. Unit cost to sample a surface point (record keeping and shipping) \_\_\_\_\_ \$/point
3. Unit cost to analyze sample(s)
  - a. Quarterly (25 PA Code §273.284 or §288.254) \_\_\_\_\_ \$/point
  - b. Annually (25 PA Code §273.284 or §288.254) \_\_\_\_\_ \$/point
4. Unit cost to analyze data (includes review of lab QA/QC data, database input, form completion, and data review) \_\_\_\_\_ \$/point
5. Cost to sample and analyze – quarterly (line 2 + line 3a + line 4) \_\_\_\_\_ \$/point
6. Cost to sample and analyze – annually (line 2 + line 3b + line 4) \_\_\_\_\_ \$/point
7. Number of years of sampling (30 + time to close) \_\_\_\_\_

### NPDES Surface Discharge Sampling

8. Number of outfalls monitored \_\_\_\_\_
9. Monitoring frequency (i.e. monthly, quarterly, etc) \_\_\_\_\_
10. Number of samples to be taken per point/year \_\_\_\_\_
11. Unit cost to sample a surface point (record keeping and shipping) \_\_\_\_\_ \$/point
12. Unit cost to analyze sample(s) (including data review and completing DMR) \_\_\_\_\_ \$/point
13. Number of years of sampling (30 + time to close) \_\_\_\_\_
14. Cost Summary –Surface Water Monitoring
  - a. Cost of Quarterly Surface Water Monitoring (line 1 x "4" x line 5 x line 7) \$ \_\_\_\_\_
  - b. Cost of Annual Surface Water Monitoring (line 1 x line 6 x line 7) \$ \_\_\_\_\_
  - c. Cost of NPDES Monitoring (line 8 x line 10 x [line 11 + line 12] x line 13) \$ \_\_\_\_\_
  - d. NPDES renewals over post-closure period (includes application development, fees, etc.) use 10% of line 14c \$ \_\_\_\_\_

**Subtotal\$** \$ \_\_\_\_\_

Adjustment for resampling, assessments, etc.

- a. Use 0% of subtotal if no assessments in last 2 yrs.
- b. Use 5% of subtotal if assessment in last 2 yrs.
- c. Use 10% if in assessment, abatement or increased monitoring

\$ \_\_\_\_\_

**Total** \$ \_\_\_\_\_

(Place this total on Summary Cost Worksheet – line 4)

Date Prepared

[Empty box for Date Prepared]

COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

I.D. Number

[Empty box for I.D. Number]

**BONDING WORKSHEET E**  
**PRIVATE WATER SUPPLY MONITORING**

- 1. Number of private water supplies monitored. \_\_\_\_\_
- 2. Unit cost to sample a well (include methane monitoring, record keeping and shipping) \_\_\_\_\_ \$/well
- 3. Unit cost to analyze sample(s) quarterly (Act 101 Section 1103) \_\_\_\_\_ \$/well
- 4. Unit cost to analyze data (includes review of lab QA/QC data, database input, form completion, and data review) \_\_\_\_\_ \$/well
- 5. Total cost for quarterly sampling (line 2 + line 3 + line 4) \_\_\_\_\_ \$/well
- 6. Number of years of sampling (30 + time to close) \_\_\_\_\_ years
- 7. Cost Summary –Private Water Supply Monitoring
  - a. Cost of quarterly monitoring (line 5 x 4 x line 6) \$ \_\_\_\_\_

**Total** \$ \_\_\_\_\_  
(Place this total on Summary Cost Worksheet – line 5)

Date Prepared

May 24, 2007

COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

I.D. Number

[Empty box for I.D. Number]

**BONDING WORKSHEET F  
GAS MONITORING SYSTEM**

- 1. Number of probes in the approved monitoring plan. \_\_\_\_\_ N/A

  - a. Shallowest probe depth \_\_\_\_\_ N/A ft.
  - b. Deepest probe depth \_\_\_\_\_ N/A ft.
  - c. Average probe depth \_\_\_\_\_ N/A ft.
  - d. Number of probes installed \_\_\_\_\_ N/A

- 2. Unit cost to install a probe (including, drilling, and installation) \_\_\_\_\_ N/A \$/probe
- 3. Number of probes to be installed (probes in the approved plan that haven't been installed) \_\_\_\_\_ N/A
- 4. Number of probes to be replaced over the life of the monitoring period (use 5% of line 1 and round up) \_\_\_\_\_ N/A
- 5. Unit cost to monitor a probe (include record keeping) \_\_\_\_\_ N/A \$/probe
- 6. Number of probes and structure monitoring events per year \_\_\_\_\_
- 7. Number of years of monitoring (30 + time to close) \_\_\_\_\_ N/A years
- 8. Cost Summary –Gas Monitoring System
  - a. System completion (line 3 x line 2) \$ \_\_\_\_\_ N/A
  - b. Probe replacement (line 2 x line 4) \$ \_\_\_\_\_ N/A
  - c. Probe Monitoring (line 1 x line 5 x line 6 x line 7) \$ \_\_\_\_\_ N/A

**Subtotal** \$ \_\_\_\_\_ N/A

Adjustment for resampling, assessments, etc.

- a. Use 0% of subtotal if no assessments in last 2 yrs.
- b. Use 5% of subtotal if assessment in last 2 yrs.
- c. Use 10% if in assessment or increased monitoring

**Total** \$ \_\_\_\_\_ **0**  
(Place this total on Summary Cost Worksheet – line 6)

Date Prepared

May 24, 2007

COMMONWEALTH OF PENNSYLVANIA  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

I.D. Number

**BONDING WORKSHEET G  
 GAS COLLECTION SYSTEM**

1. Number of wells in the approved monitoring plan. \_\_\_\_\_ N/A
  - a. Shallowest well depth \_\_\_\_\_ N/A ft.
  - b. Deepest well depth \_\_\_\_\_ N/A ft.
  - c. Average well depth \_\_\_\_\_ N/A ft.
  - d. Number of wells installed \_\_\_\_\_ N/A
  - e. Number of pumping wells \_\_\_\_\_ N/A
  
2. Cost for flare or other control device installation \$ \_\_\_\_\_ N/A LS
3. Unit cost to install a well (including, drilling, installation, and connection to active system) \_\_\_\_\_ N/A \$/well
4. Unit cost to install a gas well requiring liquid removal (including, drilling, installation, and connection to active system) \_\_\_\_\_ N/A \$/well
5. Number of wells to be installed (wells in the approved plan that haven't been installed) \_\_\_\_\_
6. Number of gas wells requiring liquid removal to be installed \_\_\_\_\_ N/A
7. Estimate the length of collection piping to be installed \_\_\_\_\_ N/A LF
8. Unit cost to install collection piping (include excavation, pipe bedding, pipe, backfilling, regrading, revegetating, surveying and QA/QC) \_\_\_\_\_ N/A \$/LF
9. Number of wells to be replaced/repaired over the life of the monitoring period (use 10% of line 1 and round up) \_\_\_\_\_ N/A
10. Unit cost to monitor well and balance system monthly (include monitoring of methane, oxygen, carbon dioxide or nitrogen, temperature, pressure, and NSPS record keeping) \_\_\_\_\_ N/A \$/well
11. Unit cost to conduct surface monitoring (NSPS) \_\_\_\_\_ N/A \$/event
12. Control System Information \_\_\_\_\_ N/A
  - a. number and size of blowers \_\_\_\_\_ N/A
  - b. flare dimensions and capacity \_\_\_\_\_ N/A
  - c. current flow rate \_\_\_\_\_ N/A
  - d. other features \_\_\_\_\_ N/A
13. Cost of electricity to run system \_\_\_\_\_ N/A \$/year
14. Cost to maintain system (including daily check, weekly charts, maintenance, etc.) \_\_\_\_\_ N/A \$/year
15. Cost of annual blower maintenance (including greasing, bearing check and alignment) \_\_\_\_\_ N/A \$/year

- 16. Cost of stack testing (once per five years) \_\_\_\_\_ N/A \$/event
- 17. Estimate the volume of condensate generated per year \_\_\_\_\_ N/A gallons
- 18. Cost of condensate management (including pumping, testing and treatment/disposal) \_\_\_\_\_ N/A \$/year
- 19. Number of years to run system (30 + time to close) \_\_\_\_\_ N/A years
- 20. Cost Summary –Gas Collection System \_\_\_\_\_ N/A

**System Installation**

- a. Additional well installation (line 5 x line 3) \$ \_\_\_\_\_ N/A
- b. Additional pumping well installation (line 4 x line 6) \$ \_\_\_\_\_ N/A
- c. Cost of collection piping (line 7 x line 8) \$ \_\_\_\_\_ N/A
- d. Well replacement (line 3 x line 9) \$ \_\_\_\_\_ N/A
- e. Enclosed ground flare system (line 2) \$ \_\_\_\_\_ N/A

**System Installation Subtotal** \$ \_\_\_\_\_ N/A  
(sum lines a to e)

- f. Cost of monitoring/balancing (line 1 x "12" x line 10 x line 19) \$ \_\_\_\_\_ N/A
- g. Cost of surface monitoring (line 11 x "1.5" x line 19) \$ \_\_\_\_\_ N/A
- h. Electric Cost (line 13 x line 19) \$ \_\_\_\_\_ N/A
- i. System maintenance cost (line 14 x line 19) \$ \_\_\_\_\_ N/A
- j. Blower maintenance cost (line 15 x line 19) \$ \_\_\_\_\_ N/A
- k. Stack testing cost (line 16 x [line 19/5]) \$ \_\_\_\_\_ N/A
- l. Condensate management cost (line 18 x line 19) \$ \_\_\_\_\_ N/A

**System Monitoring and Maintenance Subtotal** \$ \_\_\_\_\_ N/A  
(sum lines f to l)

Adjustment for miscellaneous maintenance items (including; knockout pot maintenance, thermocouple replacement, flame detector replacement, flame arrester maintenance, flare maintenance, enrichment/startup gas replacement, pneumatic valve maintenance, sump maintenance, panel board maintenance, etc.)

- a. Use 0% of subtotal if system<sup>1</sup> < 2yrs old
- b. Use 5% of subtotal if system<sup>1</sup> is > 2 yrs old, but < 5yrs old
- c. Use 10% if system<sup>1</sup> is > 5 yrs old

\$ \_\_\_\_\_ N/A

**Total** (Installation subtotal + M & M subtotal + Misc. Maintenance) \$ \_\_\_\_\_ **0**

(Place this total on Summary Cost Worksheet – line 7)

<sup>1</sup> The age of the system would be considered from the date that the active system went on-line. Expansions of the systems are assumed to occur, however, this does not change the age of the system unless a majority of the existing system is replaced/upgraded.

Date Prepared

May 24, 2007

COMMONWEALTH OF PENNSYLVANIA  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

I.D. Number

## BONDING WORKSHEET H OTHER MONITORING AND REPORTING

Please list the annual costs to maintain the following permits/registrations that apply. Additional space is provided for items applicable to your facility, but not listed.

- |   |    |                 |
|---|----|-----------------|
| 1. Title V or other air permit (include the annual permit fee, cost to complete emissions inventory and emissions fees) | \$ | _____ N/A       |
| 2. NSPS Annual Report preparation cost  | \$ | _____ N/A       |
| 3. Local permit or Host Agreement requirements  | \$ | _____ N/A       |
| 4. UST/AST registration   | \$ | _____ N/A       |
| 5. Other _____  | \$ | _____           |
| 6. Other _____  | \$ | _____           |
| 7. Other _____  | \$ | _____           |
| 8. Other _____  | \$ | _____           |
| 9. Other _____  | \$ | _____           |
| 10. Number of years of monitoring/maintenance (30 + time to close)  |    | _____ N/A years |

**Total** (sum of lines 1 to 9 x line 10) \$ \_\_\_\_\_ **0**

(Place this total on Summary Cost Worksheet – line 8)

Date Prepared

May 24, 2007

COMMONWEALTH OF PENNSYLVANIA  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

I.D. Number

**BONDING WORKSHEET I  
 LEACHATE MANAGEMENT**

**Leachate Management System Narrative:** Provide a detailed description of the leachate management system. You need to include all features of the system including but not limited to landfill sumps (with number and size of pumps and controllers), length of conveyance system, number and type of storage facilities, and treatment/disposal method. A schematic should be attached as back up.

- 1. Number of years of leachate management (30 years + closure period) \_\_\_\_\_ 30
- 2. Annual leachate volume generated \_\_\_\_\_ 0 gallons
- 3. Annual cost to manage leachate volume (include pump and pipe maintenance, electricity and monitoring)<sup>1</sup> \$ \_\_\_\_\_ N/A

**Discharge to POTW**

- 4. Unit cost to discharge leachate to a POTW \_\_\_\_\_ N/A \$/gal

**On-site Treatment (including pretreatment)**

- 5. Unit cost for treatment of leachate (include equipment maintenance, electricity, personnel, chemicals, sludge disposal, etc.) \_\_\_\_\_ N/A \$/gal
- 6. Annual cost to maintain NPDES permit (include sampling, analysis, report preparation, and factor in five year renewal application preparation and fees) \$ \_\_\_\_\_ N/A

**Interim Trucking of Leachate**

- 7. Unit cost to transport and dispose of leachate \_\_\_\_\_ N/A \$/gal
- 8. NPDES Permit (cost to prepare application, fees and sampling/analysis) \$ \_\_\_\_\_ N/A
- 9. Cost to construct on-site treatment or pretreatment system or connection to POTW \$ \_\_\_\_\_ N/A
- 10. Unit cost for treatment of leachate (include equipment maintenance, electricity, personnel, chemicals, etc.) \_\_\_\_\_ N/A \$/gal
- 11. Annual cost to maintain NPDES permit (include sampling, analysis, report preparation, and factor in five year renewal application preparation and fees) \$ \_\_\_\_\_ N/A

<sup>1</sup> Does not include storage of leachate which is contained on Worksheet K



12. Cost Summary:

a. Cost to manage/convey leachate (line 1 x line 3) \$ \_\_\_\_\_ N/A

*If discharge to POTW*

b. Discharge to POTW cost (line 1 x line 2 x line 4) \$ \_\_\_\_\_ N/A

*If have on-site treatment*

c. Treatment cost (line 1 x line 2 x line 5) \$ \_\_\_\_\_ N/A

d. NPDES maintenance cost (line 1 x line 6) \$ \_\_\_\_\_ N/A

*If you currently truck leachate*

e. Cost of trucking leachate for three years (line 1 x "3" x line 10 x line 12) \$ \_\_\_\_\_ N/A

f. NPDES permit (line 8) \$ \_\_\_\_\_ N/A

g. Cost to construct on-site treatment system or connection to POTW (line 9) \$ \_\_\_\_\_ N/A

h. Treatment cost ((line 1 – 3) x line 2 x line 10) \$ \_\_\_\_\_ N/A

i. NPDES maintenance cost ((line 1 – 3) x line 11) \$ \_\_\_\_\_ N/A

*If you currently store leachate in impoundments*

j. Size of pond(s) \_\_\_\_\_ N/A acres

k. Estimate volume of material to be removed (including liner system and minimum of 12" of soil) \_\_\_\_\_ N/A CY

l. Unit cost to dispose of materials (Worksheet A, line 4) \_\_\_\_\_ N/A \$/CY

m. Cost to dispose of materials (line k x line l) \$ \_\_\_\_\_ N/A

n. Volume of structural backfill \_\_\_\_\_ N/A CY

o. Cost for backfill (line n x Worksheet B, line 8a) \$ \_\_\_\_\_ N/A

p. Revegetation cost \$ \_\_\_\_\_ N/A LS

**Subtotal** \$ \_\_\_\_\_ **\$0**  
(sum of a – i) +m+o+p)

Adjustment for maintenance, equipment replacement and contingencies, etc. Please note that these are cumulative and you must add all of the percentages that apply to arrive at the final adjustment percentage. The minimum adjustment is 10%.

- a. Add 10% of subtotal if pumps are used to convey leachate.
- b. Add 5 % of subtotal if flow volume to POTW is restricted.
- c. Add 10% of subtotal if leachate is stored in ponds
- d. Add 10% of subtotal if onsite treatment
- e. Add 15% if trucking leachate
- f. Add 10% if current leachate generation exceeds 5MG/year

Final adjustment factor: 20 %

g. Adjustment (subtotal x factor) \$ \_\_\_\_\_ \$0

**Total** (subtotal + adjustment) \$ \_\_\_\_\_ **\$0**

(Place this total on Summary Cost Worksheet – line 9)



Civil & Environmental Consultants, Inc.

PROJECT PPL GEN., LLC, BRUNNER ISLAND STEAM  
Bonding Worksheet I, Leachate Management

PROJECT NO. 060338.002  
PAGE 1 OF 1

MADE BY GDT DATE 05/24/07 CHECKED BY [Signature] DATE 5-25-07

**CALCULATION BRIEF  
BONDING WORKSHEET I  
LEACHATE MANAGEMENT  
AREA 8**

**OBJECTIVE:** Determine the total bond amount required for leachate management during closure.

**METHODOLOGY:** Estimate sampling, analysis, and reporting costs associated with leachate management for Area 8, as required in PaDEP Bonding Worksheet I.

**LINE ITEM ASSUMPTIONS AND CALCULATIONS**

2. The proposed design consists of liner and cap systems that include geomembrane layers that are generally impermeable. Consequently, once capped Area 8's leachate generation will decrease to zero. Attachment 1.4 includes HELP model output supports this assumption. With final cover in place, HELP predicts that there will be zero leachate generation following closure.

Since there will be no predicted leachate generation following landfill closure, there will be no costs associated with maintaining the leachate management system.

Date Prepared

May 24, 2007

COMMONWEALTH OF PENNSYLVANIA  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

I.D. Number

**BONDING WORKSHEET J  
 BORROW AREA CLOSURE**

**How do I start?** Select a likely "worst case" scenario where you would have a maximum amount of the borrow area open and in need of closure. Provide a description of the scenario with references to site development stages.

- 1. Size of borrow area \_\_\_\_\_ 0 acres
- 2. Volume of material required for regrading: \_\_\_\_\_ N/A CY
- 3. Unit cost to regrade (provide equipment and rates) \_\_\_\_\_ N/A \$/CY

Are sufficient soils available to complete job?  
 (list deficit amount and attach maps that identify sources and stockpiles)

| 4. Earthen Materials               |     |       |                          |                          | Processing Req'd         |                          |                          |                          |
|------------------------------------|-----|-------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|                                    |     |       | Stockpile                | Borrow                   | Onsite                   | Offsite                  | Yes                      | No                       |
| a. Structural Fill                 | N/A | CY    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Unit cost to place <sup>1</sup> | N/A | \$/CY |                          |                          |                          |                          |                          |                          |
| c. Topsoil                         | N/A | CY    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Unit cost to place <sup>1</sup> | N/A | \$/CY |                          |                          |                          |                          |                          |                          |

5. Revegetation Cost

- (Seeding rate used: \_\_\_\_\_ N/A lbs/acre)
- (Lime rate used: \_\_\_\_\_ N/A tons/acre)
- (Fertilizer rate used: \_\_\_\_\_ N/A tons/acre)
- (Mulch rate used: \_\_\_\_\_ N/A tons/acre)

Unit cost to revegetate \_\_\_\_\_ N/A \$/acre

- 6. E & S Controls \_\_\_\_\_ N/A \$/acre
- 7. Bond Maintenance Cost (required if off-site borrow area) \$ \_\_\_\_\_ N/A LS
- 8. Other costs (provide detail) \$ \_\_\_\_\_ N/A

<sup>1</sup> The unit costs should include all associated costs including, but not limited to cost of material, excavation, transportation, processing and placement.

9. Cost Summary

- a. Fill/Regrading (line 2 x line 3) \$ \_\_\_\_\_ N/A
- b. Structural Fill (line 4a x line 4b) \$ \_\_\_\_\_ N/A
- c. Topsoil (line 4c x line 4d) \$ \_\_\_\_\_ N/A
- d. Revegetation (line 1 x line 5) \$ \_\_\_\_\_ N/A
- e. E & S Controls (line 6) \$ \_\_\_\_\_ N/A
- f. Bond maintenance (line 7) \$ \_\_\_\_\_ N/A
- g. Other (line 8) \$ \_\_\_\_\_ N/A

**Subtotal** \$ \_\_\_\_\_ N/A

CQA/Project Management costs (use 5% of subtotal) \$ \_\_\_\_\_ N/A

**Total** \$ \_\_\_\_\_ **0**

(Place this total on Summary Cost Worksheet – line 10)

Date Prepared

May 24, 2007

COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

I.D. Number

**BONDING WORKSHEET K  
FACILITY MAINTENANCE COSTS**

- |  |          |                  |
|--|----------|------------------|
| 1. Size of facility ( <i>Retired Ash Basin 5</i> )                 | _____    | 98.6 acres       |
| 2. Size of waste placement footprint                               | _____    | 20 acres         |
| 3. Size of borrow areas on site                                    | _____    | 0 acres          |
| 4. Size of leachate ponds on site                                  | _____    | acres            |
| 5. Size of sedimentation ponds on site                             | _____    | acres            |
| 6. Length of stormwater conveyance ditches                         | _____    | 2,065 LF         |
| 7. Number of years of site management (30 years + closure period)  | _____    | 30 years         |
| 8. Annual Cost to repair cap and final cover <sup>1</sup>          | _____    |                  |
| a. Acres (use 1% of line 2)  | _____    | 0.2 acres        |
| b. Unit cost <sup>2</sup> to repair final cover                    | _____    | \$3,300 \$/acre  |
| c. Unit cost <sup>2</sup> to repair cap                            | _____    | \$13,940 \$/acre |
| d. Unit cost <sup>2</sup> to repair vegetation                     | _____    | \$2,760 \$/acre  |
| e. Total unit cost (line b + line c + line d)                      | _____    | \$20,000 \$/acre |
| 9. Annual Cost to repair and maintain E&S facilities <sup>1</sup>  |          |                  |
| a. Channel repair length (use 3% of line 6)                        | _____    | 62 LF            |
| b. Sedimentation pond repair volume (use 20% of line 5)            | _____    | acres            |
| c. Unit cost <sup>2</sup> to repair channels                       | _____    | \$46.80 \$/LF    |
| d. Unit cost <sup>2</sup> to repair ponds                          | _____    | \$/acre          |
| e. Total annual cost (line a x line c) + (line b x line d)         | _____    | \$2,902 \$/YR    |
| 10. Annual Cost to repair and maintain leachate ponds <sup>1</sup> |          |                  |
| a. Leachate pond repair volume (use 20% of line 4)                 | _____    | acres            |
| b. Unit cost <sup>2</sup> to repair leachate pond(s)               | _____    | \$/acre          |
| 11. Annual cost to repair and maintain leachate tanks              |          |                  |
| a. Number and size of tanks  | _____    | N/A              |
| b. Annual unit cost <sup>1</sup> to maintain tanks                 | \$ _____ | N/A              |
| 12. Annual cost to repair fences and gates (attach details)        | \$ _____ | N/A LS           |

<sup>1</sup> After the site is stabilized, the Department may allow a reduction in these requirements.

<sup>2</sup> Please refer to the instructions. This estimate should reflect unit costs to bring in a contractor to complete the work and should include mobilization, equipment cost, operator costs, material costs and clean-up and inspection costs.

13. Annual cost to maintain site roads

|  |                    |
|--|--------------------|
| a. Length of site roads <sup>2</sup>                           | <u>720</u> LF      |
| b. Annual length of site roads to be repaired (2% of line 13a) | <u>15</u> LF       |
| c. Unit cost to repair roads <sup>1</sup>                      | <u>\$194</u> \$/LF |

14. Cost Summary – Facility Maintenance

|   |                            |
|---|----------------------------|
| a. Cost to repair cap/cover (line 7 x line 8a x line 8e)          | \$ <u>\$102,670</u>        |
| b. Cost to maintain E&S facilities (line 7 x line 9e)             | \$ <u>\$37,200</u>         |
| c. Cost to maintain leachate ponds (line 7 x line 10a x line 10b) | \$ <u>N/A</u>              |
| d. Cost to maintain leachate tanks (line 7 x line 11a x line 11b) | \$ <u>N/A</u>              |
| e. Cost to repair fences and gates (line 7 x line 12)             | \$ <u>N/A</u>              |
| f. Cost to maintain site roads (line 7 x line 13b x line 13c)     | \$ <u>\$87,300</u>         |
| <b>Subtotal</b>   | <b>\$ <u>\$227,170</u></b> |

1. Please refer to the instructions. This estimate should reflect unit costs to bring in a contractor to complete the work and should include mobilization, equipment cost, operator costs, material costs and clean-up and inspection costs. Costs not incurred annually should be determine and divided among the years between events. The costs should also include replacements of pumps and meters, electricity used (pumps, heat tracing, etc.) valve replacement and sludge disposal.

2. This should include access to all maintenance and monitoring areas including but not limited to the disposal area, ponds, leachate conveyance system, tanks, discharge locations, gas extraction system wells, gas probes, groundwater monitoring system and surface water monitoring points.

Adjustment for maintenance, equipment replacement and contingencies, etc. Please note that these are cumulative and you must add all of the percentages that apply to arrive at the final adjustment percentage. The minimum adjustment is 10%.

- a. Add 5% of subtotal if final slopes or benches have been modified from what is specified in 25 PA Code §273.234(f)
- b. Add 5% of subtotal if more than 30 % stormwater channels are unlined
- c. Add 5% of subtotal if the length of site access roads exceeds 5 miles
- d. Add 10% for mowing

Final adjustment factor: 15 %

e. Adjustment (subtotal x factor) \$ \$34,080

**Total (subtotal + adjustment) \$ \$261,250**

(Place this total on Summary Cost Worksheet – line 11)

<sup>1</sup> After the site is stabilized, the Department may allow a reduction in these requirements.

<sup>2</sup> Please refer to the instructions. This estimate should reflect unit costs to bring in a contractor to complete the work and should include mobilization, equipment cost, operator costs, material costs and clean-up and inspection costs.



Civil & Environmental Consultants, Inc.

PROJECT PPL GEN., LLC, BRUNNER ISLAND STEAM  
Bonding Worksheet K, Facility Maintenance Costs

PROJECT NO. 060338.002  
PAGE 1 OF 2

MADE BY GDT DATE 05/24/07 CHECKED BY B DATE 5-25-07

**CALCULATION BRIEF  
BONDING WORKSHEET K  
FACILITY MAINTENANCE COSTS  
AREA 8**

**OBJECTIVE:** Determine the total bond amount required for facility maintenance.

**METHODOLOGY:** Estimate facility maintenance costs for Area 8, as required in PADEP Bonding Worksheet K.

**LINE ITEM ASSUMPTIONS AND CALCULATIONS**

1. The size of the facility (98.6 ac) is the size of retired ash impoundment "Basin 5".
2. The waste placement footprint (20 ac).
6. The total length of the stormwater conveyance channels was measured from the design drawings.
- 8b. The unit cost is to regrade existing inplace cover soil to address erosion or equipment damage. From Means 2007 Heavy Construction Cost Data, the cost to grade steep slopes is \$0.20/sy. It is assumed that a \$500 mobilization cost would be encountered with each repair. Since the annual repair area is relatively small the mobilization cost becomes a large component of the per acre repair cost.

$$\begin{aligned} \text{Unit Final Cover Repair Cost} &= (\$0.17/\text{sy}) * (4,840 \text{ sy/ac}) + \$500/0.2 \text{ acres} \\ &= \underline{\underline{\$3,300/\text{ac}}} \end{aligned}$$



Civil & Environmental Consultants, Inc.

PROJECT PPL GEN., LLC, BRUNNER ISLAND STEAM  
Bonding Worksheet K, Facility Maintenance Costs

PROJECT NO. 060338.002  
PAGE 2 OF 2

MADE BY GDT DATE 05/24/07 CHECKED BY [Signature] DATE 5-25-07

- 8c. The unit cost to repair the cap assumes 25 percent of the cost to construct the cap. The installed liner costs were taken from the cap cost estimates (Worksheet B). Based on the rates on Worksheet B, the cap installation costs are:

$$\begin{aligned} \text{FML Installation Cost} &= (43,560 \text{ sf/ac}) * (\$0.58/\text{sf}) = \$25,265/\text{ac} \\ \text{Drainage Composite Installation Cost} &= (43,560 \text{ sf/ac}) * (\$0.70/\text{sf}) = \$30,492/\text{ac} \\ \text{Total Cap Installation Cost} &= \$25,265/\text{ac} + \$30,492/\text{ac} = \$55,757/\text{ac} \end{aligned}$$

Therefore, the unit cost to repair the cap is calculated as follows:

$$\begin{aligned} \text{Cap Repair Cost} &= \$55,757/\text{ac} * 0.25 \\ \text{Cap Repair Cost} &= \$13,940/\text{ac} \end{aligned}$$

- 8d. The unit cost to repair vegetation was assumed to be the same as the revegetation cost developed in Worksheet B, Item 12, and is \$2,760/acre.
- 9c. The unit cost to repair channels assumes regrading will be performed to address erosion or equipment damage. It is assumed that 12 hours will be needed to perform this work. It also assumed that the hourly cost for the equipment and operator to perform this work would be \$200/hr. It is also assumed that a \$500 mobilization cost would be encountered with each repair. Since the annual repair area is relatively small the mobilization cost becomes a large component of the per acre repair cost.

$$\begin{aligned} \text{Unit Channel Repair Cost} &= ((\$200/\text{hr} * 12 \text{ hrs}) + \$500 \text{ Mob})/62 \text{ LF of channel} \\ &= \underline{\underline{\$46.80/\text{LF of channel}}} \end{aligned}$$

11. Following closure zero leachate generation is predicted. Therefore, the proposed tanks will not be needed for leachate management. It is assumed that the tanks will be for other Plant needs and are not considered in post-closure maintenance.
12. The fence around the property also provides security for the Plant. Consequently, it is assumed that the Plant will perform any needed repairs as part of Plant operations. Therefore, fence repairs are not applicable in the bonding worksheet.
- 13c. The unit cost to repair access roads assumes regrading will be performed to address erosion or equipment damage. It is assumed that 12 hours will be needed to perform this work. It also assumed that the hourly cost for the equipment and operator to perform this





Civil & Environmental Consultants, Inc.

PROJECT PPL GEN., LLC, BRUNNER ISLAND STEAM  
Bonding Worksheet K, Facility Maintenance Costs

PROJECT NO. 060338.002  
PAGE 3 OF 2

MADE BY GDT DATE 05/24/07 CHECKED BY DF DATE 5-25-07

work would be \$200/hr. It is also assumed that a \$500 mobilization cost would be encountered with each repair. Since the annual repair area is relatively small the mobilization cost becomes a large component of the per acre repair cost.

$$\text{Unit Access Road Repair Cost} = ((\$200/\text{hr} * 12 \text{ hrs}) + \$500 \text{ Mob})/15 \text{ LF}$$

$$= \underline{\underline{\$193.33/\text{LF of Access Road}}}$$

Date Prepared

May 24, 2007

COMMONWEALTH OF PENNSYLVANIA  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

I.D. Number

[Empty box for I.D. Number]

**BONDING WORKSHEET L**  
**SUMMARY COST WORKSHEET**

**Cost Summary - Landfills**

|                                    |          |             |
|------------------------------------|----------|-------------|
| 1. Decontaminating the Facility    | \$ _____ | 0           |
| 2. Capping/Closure                 | \$ _____ | \$1,450,800 |
| 3. Groundwater Monitoring System   | \$ _____ | ??          |
| 4. Surface Water Monitoring        | \$ _____ | ??          |
| 5. Private Water Supply Monitoring | \$ _____ | ??          |
| 6. Gas Monitoring                  | \$ _____ | N/A         |
| 7. Gas Collection and Maintenance  | \$ _____ | N/A         |
| 8. Other Monitoring                | \$ _____ | 0           |
| 9. Leachate Management             | \$ _____ | 0           |
| 10. Borrow Area Closure            | \$ _____ | N/A         |
| 11. Maintenance Costs              | \$ _____ | \$261,250   |
| 12. Other Costs <sup>1</sup> _____ | \$ _____ | 0           |
| 13. Other Costs <sup>1</sup> _____ | \$ _____ | 0           |
| <b>Subtotal</b>                    | \$ _____ | ??          |

**Inflation**

|  |          |        |
|--|----------|--------|
| 14. Inflation rate (projected inflation for the next three years based on the inflation for the prior three years).* | _____    | 3.10 % |
| 15. Inflation cost for facility (subtotal x line 14)   | \$ _____ |        |

**Contingency and administrative fees**

|  |          |
|--|----------|
| 16. Administrative fees (5%) (subtotal x 0.05)                                 | \$ _____ |
| 17. Project Management (5%) (subtotal x 0.05)                                  | \$ _____ |
| 18. Contingency fee amount (subtotal x rate of contingency fee from Table 1)** | \$ _____ |

**Total** (subtotal + line 15 + line 16 + line 17 + 18) \$ \_\_\_\_\_

\*Inflation rate for the next 3 years was calculated as the average of the inflation for for 2004 (2.68%), 2005 (2.39%), and 2006 (3.24%).

\*\*Contingency fee from Table 1 is 10%.

<sup>1</sup> You should include any costs that would be incurred by the Department, but were not included in these sheets. Provide separate sheets for documentation.