

CLOSURE & POST-CLOSURE PLANS
NEW CASTLE STATION ASH LANDFILL
WEST PITTSBURGH, LAWRENCE COUNTY, PENNSYLVANIA

Prepared for:



NRG POWER MIDWEST LP
NEW CASTLE GENERATING STATION
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CEC Project 154-531.0003

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Civil & Environmental Consultants, Inc.

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CLOSURE & POST-CLOSURE PLAN NEW CASTLE STATION ASH LANDFILL

1.0 PURPOSE

On behalf of NRG Power Midwest LP (NRG), Civil & Environmental Consultants, Inc. (CEC) has prepared this Closure & Post-Closure Plan for the New Castle Station Ash Landfill in accordance with the United States Environmental Protection Agency (USEPA) Coal Combustion Residuals (CCR) Rule 40 CFR 257.102, 257.103, and 257.104 (§257.102, §257.103, and §257.104) dated April 17, 2015. This Closure & Post-Closure Plan has been prepared to describe the steps necessary to close the landfill at any point during the active life consistent with recognized and generally accepted good engineering practices.

For existing CCR landfills, the plans must be prepared no later than October 17, 2016 and placed in the facility's operating record. The owner or operator of the CCR unit must obtain a written certification from a qualified professional engineer that the design meets the requirements of this section. The professional engineer certification is provided in Appendix A.

2.0 BACKGROUND

New Castle Station Ash Landfill (Landfill) is located in West Pittsburg, Lawrence County, Pennsylvania. Refer to Figure 1 in Appendix B for the Site Location Map. The Landfill operates under Pennsylvania Department of Environmental Protection (PADEP) Solid Waste Permit No. 300818 issued April 23, 2008. The Landfill is a captive residual waste disposal facility that receives CCR from New Castle Generating Station (Station) and sediments from the ponds at the site (residual wastes). The Station ceased using coal to generate power on March 23, 2016. Disposal of residual wastes at the Landfill is anticipated to continue through the Station's estimated shutdown date in the mid-2030s during CCR decommissioning activities at the site.

The Landfill was constructed in Stages. Stages 1, 2, and 3 were constructed prior to the effective date of the CCR Rule and are overlain by a final cover system or by the liner/leachate collection system for Stages 4, 5, and 6. A Major Permit Modification (MPM) Application to PADEP Solid Waste Permit No. 300818 was submitted in December 2010 and approved on June 9, 2011. The MPM Application included proposed filling alternates for Stages 4, 5, and 6 of the landfill over Stages 1, 2, and 3. The MPM Application included filling of Stage 4 over a liner/leachate collection system, installation of a final cover system for Stage 5, and either installation of a final cover system (Alternate 6A) or filling (Alternate 6B) of Stage 6. Alternative 6A was constructed. The liner/leachate collection system and final cover system were designed to meet the requirements of the PADEP residual waste regulations. The final cover system includes the following components:

- 40 mil Textured HDPE geomembrane
- Drainage Geocomposite
- 2-foot cover soil

The Top of Final Cover Grading Plan for Alternate 6A is included in the drawing set for the PADEP MPM Application dated December 2010. In the Stage 4 area, the final cover grading plan is 3H:1V final grades with 15-foot wide benches spaced approximately every 25-feet vertically. The benches provide storm water management in final conditions to reduce the potential for erosion of the final cover system. In Stage 5 and Stage 6, the final cover grading plan has varying slopes with storm water controls, including approximate maximum slopes of 3H:1V and approximate minimum slopes of 2 percent. Details are also included in the drawing set for the PADEP MPM Application.

3.0 COMPLIANCE WITH §257.102 – CRITERIA FOR CONDUCTING THE CLOSURE OF CCR UNITS

The following sections address the information required by §257.102. The site will be closed in accordance with §257.102 and the PADEP approved Form 18R: Closure/Post-Closure Land Use

Plan included in the MPM Application. The PADEP approved Form 16R: Liner System provides the design of the final cover system and meets the requirements under §257.102.

3.1 NARRATIVE OF CLOSURE – §257.102(b)(1)(i)

The Landfill will be closed by leaving CCR in-place and placing a final cover system above in-place CCR. In Stages 5 and 6, a final cover system was installed prior to the effective date of the CCR Rule over the initial Stages of the Landfill (Alternate 6A). A final cover system was also installed prior to the effective date of the CCR Rule over portions of Stages 1, 2, and 3 that were not overlain by Stages 4, 5, and 6. Areas with final cover system installed are shown on the drawing included in the 2015 Annual Landfill Operation Report (ALOR) included in Appendix B. The final cover system consists of geomembrane, geocomposite, and 2-feet of cover soil. Final cover soils will be vegetated to minimize the potential for erosion and infiltration into the existing residual waste.

Filling of Stage 4 has occurred in general accordance with the grading plan. With coal burning operations of the Station ceasing in 2016, the Landfill may not utilize all remaining disposal capacity in Stage 4, and the permitted final grades may not be achieved. If the permitted final grades are not achieved, the operator will implement the following:

- Grade slopes in active areas to blend into adjacent contours;
- Place final cover on all of the disposal area containing waste;
- Revegetation of all disturbed areas;
- Perform all other closure activities planned; and
- Prepare a revised final grading plan for inclusion in this Closure Plan.

3.2 CCR REMOVAL AND DECONTAMINATION – §257.102(b)(1)(ii)

The Landfill will be closed by leaving CCR in-place so this section is not applicable.

3.3 FINAL COVER REQUIREMENTS – §257.102(b)(1)(iii) and §257.102(d)

§257.102(b)(1)(iii) requires a description of the final cover system if closure will be accomplished by leaving CCR in-place, and refers to §257.102(d) for final cover system requirements. The final cover system for the Landfill includes the following components (from bottom to top):

- 40 mil Textured HDPE geomembrane
- Drainage Geocomposite
- 2-foot cover soil

§257.102(d)(3) allows for use of an alternate final cover system design, provided that the alternate final cover system is designed and constructed to meet the requirements in (d)(3)(ii). Due to the use of a geomembrane as the infiltration layer (a layer to limit infiltration), the requirements of §257.102(d)(3)(ii) for an alternate final cover system are addressed below:

- §257.102(d)(3)(ii)(A), the design of the final cover system must include an infiltration layer that achieves an equivalent reduction in infiltration as the infiltration layer specified in paragraphs (d)(3)(i)(A) and (B).
 - §257.102(d)(3)(i)(A) the permeability of the final cover system must be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} cm/sec whichever is less. The final cover system, which includes a geomembrane, is less permeable than the subbase soils and the requirement of 1×10^{-5} cm/sec. A liner/leachate collection system was installed under Stage 4 and over the initial stages of the landfill prior to filling with residual waste. The permeability of the final cover system that will be placed over Stage 4 is equal to the permeability of the bottom liner system, both of which include a geomembrane.
 - §257.102(d)(3)(i)(B), infiltration of liquids through the closed landfill must be minimized by use of an infiltration layer that contains a minimum of 18-inches of earthen material. Instead of a soil infiltration layer, a geomembrane is being used

to minimize the infiltration of liquids through the closed landfill. The geomembrane is much less permeable and allows much less infiltration than 18-inches of soil with a maximum permeability of 1×10^{-5} cm/sec.

- §257.102(d)(3)(ii)(B), the design of the final cover system must include an erosion layer that provides equivalent protection from wind or water erosion as the erosion layer specified in paragraph (d)(3)(i)(C).
 - §257.102(d)(3)(i)(C), erosion of the final cover system must be minimized by use of an erosion layer that contains a minimum of 6-inches of earthen material that is capable of sustaining native plant growth. The final cover system includes 24-inches of soil above the geosynthetics, which is capable of sustaining plant growth to minimize erosion. The final cover soil will be compacted sufficiently to allow loaded vehicles to successfully maneuver without excessive rutting; however, the cover soils will not be compacted excessively to preclude the establishment of vegetation.
- §257.102(d)(3)(ii)(C), localized settling and subsidence is not anticipated as CCR are placed and compacted. If localized settling or subsidence occurs, the slopes of the final grades are expected to still provide positive drainage during final conditions.

Additionally, the final cover system must meet the performance requirements of §257.102(d)(1), which are addressed below:

- §257.102(d)(1)(i), the final cover system will minimize the potential for infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere.
- §257.102(d)(1)(ii), the final cover system must preclude the probability of future impoundment of water, sediment, or slurry. The permitted final grades have approximate maximum slopes of 3H:1V and approximate minimum slopes of 2 percent which promotes surface water runoff. The installation of the final cover system will reduce the probability of future impoundment of water on the landfill.

- §257.102(d)(1)(iii), the final cover system must include measures that provide for major slope stability to prevent the sloughing or movement of the final cover system during the closure and post-closure care period. These components have been used in final cover systems with slopes of 3H:1V, and are shown to be stable. The stability of the final cover system was evaluated in the MPM Application, Form 16R.
- §257.102(d)(1)(iv), the final cover system must minimize the need for further maintenance of the CCR unit. The design of the final cover minimizes the need for further maintenance of the CCR unit. The post-closure land use is grassland, open pasture which requires minimal maintenance activities.
- §257.102(d)(1)(v), the final cover system must be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices. The final cover system will be installed over Stage 4 after filling is complete as addressed in Section 3.6.

3.4 MAXIMUM CCR INVENTORY – §257.102(b)(1)(iv)

The 2015 Landfill ALOR indicated that the total permitted capacity of the landfill is 3,227,400 tons.

3.5 MAXIMUM AREA REQUIRING FINAL COVER – §257.102(b)(1)(v)

The maximum area requiring final cover is approximately 16.8 acres. The drawing from the ALOR shows that approximately 17.9 acres of Stages 1, 2, and 3, approximately 11.6 acres of Stage 5, and approximately 10.2 acres of Stage 6 had a final cover system installed prior to the effective date of the CCR Rule, and only an additional 16.8 acres of Stage 4 will require a final cover system after filling is complete.

3.6 CLOSURE SCHEDULE – §257.102(b)(1)(vi)

The maximum area requiring final cover is approximately 16.8 acres. CCR disposal at the Landfill is anticipated to continue through the Station's estimated shutdown date in the mid-

2030s. In accordance with §257.102(e)(1)(i), closure activities must commence no later than 30 days after the date on which the CCR unit receives the final receipt of waste, either CCR or any non-CCR waste stream unless an extension is requested. The closure process is initiated by the state closure permit process and posting of a notification of intent to close the CCR facility. The notification must include a certification by a qualified professional engineer that the design of the final cover system meets the requirements of §257.102(d)(3) in accordance with §257.102(d)(3)(iii) and §257.102(g).

In accordance with §257.102(f)(1)(i) closure activities will be completed within 6 months of commencing closure activities. If the proposed closure construction schedule cannot be met, NRG will submit a demonstration in accordance with paragraph §257.102(f)(2)(i) providing the basis for the additional time to complete closure. CCR landfills may extend the timeframe to complete closure of the CCR unit two times in one-year increments. Closure activities are permitted under PADEP Solid Waste Permit No. 300818. No additional permits are needed for closure activities for this Landfill.

Once closure is complete, a professional engineer will verify and certify that closure has been completed in accordance with §257.102(f)(3). Within 30 days of completing closure, a notification of closure will be prepared including the professional engineer's certification of completion in accordance with §257.102(h). A notation must also be recorded on the deed to the property, or some other instrument that is normally examined during title search in accordance with §257.102(i), to notify potential buyers that the land has been used as a CCR unit and its use is restricted under the post-closure care requirements as provided by §257.104(d)(1)(iii).

4.0 COMPLIANCE WITH §257.103 – ALTERNATE CLOSURE REQUIREMENTS

NRG is not currently proposing alternative closure requirements for the landfill. If an alternate closure is proposed in the future, NRG will document that the conditions required in this section are met.

5.0 COMPLIANCE WITH §257.104 – POST-CLOSURE CARE REQUIREMENTS

The post-closure care for the Landfill will be performed in accordance with §257.104 and the PADEP approved Form 18R: Closure/Post-Closure Land Use Plan included in the MPM Application.

5.1 POST CLOSURE CARE MAINTENANCE FOR FINAL COVER SYSTEM – §257.104(b)(1)

The final cover system will be repaired during the post-closure care period to address settlement, subsidence, erosion and other events and prevent run-on and run-off from eroding or otherwise damaging the final cover during the post-closure care period.

5.2 POST CLOSURE CARE MAINTENANCE FOR LEACHATE COLLECTION SYSTEM – §257.104(b)(2)

The integrity and effectiveness of the leachate collection and removal system and operations of the leachate collection and removal system will be maintained in accordance with §257.70. In Stage 4, leachate flows through the leachate collection layer and is collected in a sump. The sump gravity drains and ultimately conveys leachate to a leachate pond. The leachate pond discharges through an outfall permitted under NPDES Permit No. PA0005061. Due to the gravity drain design, the leachate collection system in Stage 4 requires minimal maintenance.

5.3 GROUNDWATER MONITORING – §257.104(b)(3)

The groundwater monitoring system will be maintained and monitored in accordance with §257.90 through §257.98.

5.4 POST-CLOSURE CARE PERIOD – §257.104(c)

Post-closure care will be conducted for 30 years. If at the end of the post-closure care period the CCR unit is operating under assessment monitoring in accordance with §257.95, NRG will continue to conduct post-closure care until returning to detection monitoring in accordance with §257.95.

5.5 WRITTEN POST-CLOSURE PLAN – §257.104(d)(1)(i)

As required by §257.104(b), the final cover system, leachate collection system, and groundwater monitoring system will be maintained during the post-closure care period. During the post-closure care period, the following measures will be implemented:

- Erosion and Sedimentation Control - The erosion and sedimentation controls will remain in-place following facility closure and will serve as storm water management controls. The erosion and sedimentation controls will be inspected and maintained.
- Revegetation and Regrading, Including Maintenance of the Final Cover - The final cover system will be monitored during routine site inspections and after heavy rains. Regrading and reseeded will be performed as necessary.
- Access Control - Access to the landfill is controlled by gates controlling access to the Station, which is located on the property. No changes are anticipated following closure of the facility.
- Other Maintenance Activities – The site will be inspected on a monthly basis for the first year following closure. Every year thereafter, the facility will be inspected quarterly or after major storm events. Any corrective measures with respect to roads, ponds, channels, or final cover will be taken as required.

5.6 FACILITY CONTACT – §257.104(d)(1)(ii)

The Landfill is a captive facility located at the Station. The Station operates 7 days per week, 24 hours per day. As a result, someone is typically available at the Station. Office contact information is as follow:

New Castle Generating Station
Environmental Compliance Specialist
2189 State Route 168 South
West Pittsburg, Pennsylvania 16160-0325
Phone Number: 724-535-1825

The contact information that is being provided is for an office and a position; therefore, an e-mail address has not been provided.

5.7 DESCRIPTION OF LAND USE – §257.104(d)(1)(iii)

The post-closure land use is grassland, open pasture which requires minimal maintenance activities. The deed notation required under §257.102(i) will protect future uses of the property.

5.8 PLAN AMENDMENT

The initial Closure Plan and Post-Closure Plan can be amended (§257.102(b)(3) and §257.104(d)(3), respectively) at any time, and must be amended whenever a change in operations substantially affects the written plan in effect. The Closure Plan must be amended at least 60 days prior to a planned change in operation, or no later than 60 days after an unanticipated event. In addition, if closure activities have commenced for the Landfill, then the initial written Closure Plan must be revised within 30 days of the event.

6.0 CONCLUSION

The Closure/Post Closure Plan demonstrates compliance with §257.102 and §257.104 of the CCR Rule. The certification statement by a qualified professional engineer is provided in Appendix A and supporting documents are provided in Appendices B.

This demonstration will be placed in the operating record by October 17, 2016. The Closure and Post-Closure Plans may be amended at any time.

7.0 REFERENCES

1. Application for Major Permit Modification of Vertical Expansion. New Castle Ash Landfill. Permit I.D. No. 300818. December 2010. Civil & Environmental Consultants, Inc.

APPENDIX A

PROFESSIONAL ENGINEER CERTIFICATION STATEMENT

PROFESSIONAL ENGINEER CERTIFICATION

This Closure & Post-Closure Plan fulfills the CCR Rule requirements (40 CFR Parts 257 and 261) dated April 17, 2015. This Closure & Post-Closure Plan will be placed in the operating record by October 17, 2016.

I, Angela M. Ramirez, P.E., a registered professional engineer in the State of Pennsylvania, certify that the Closure & Post-Closure Plans for the New Castle Station Ash Landfill fulfill the requirements of §257.102 and §257.104. This certification is based on my review of the Closure & Post Closure Plans for New Castle Station Ash Landfill.

Angela M. Ramirez, P.E.

Printed Name of Professional Engineer

Angela M Ramirez

Signature

PE082317

Registration No.

Pennsylvania

Registration State

10-14-2016

Date

Stamp/Seal:

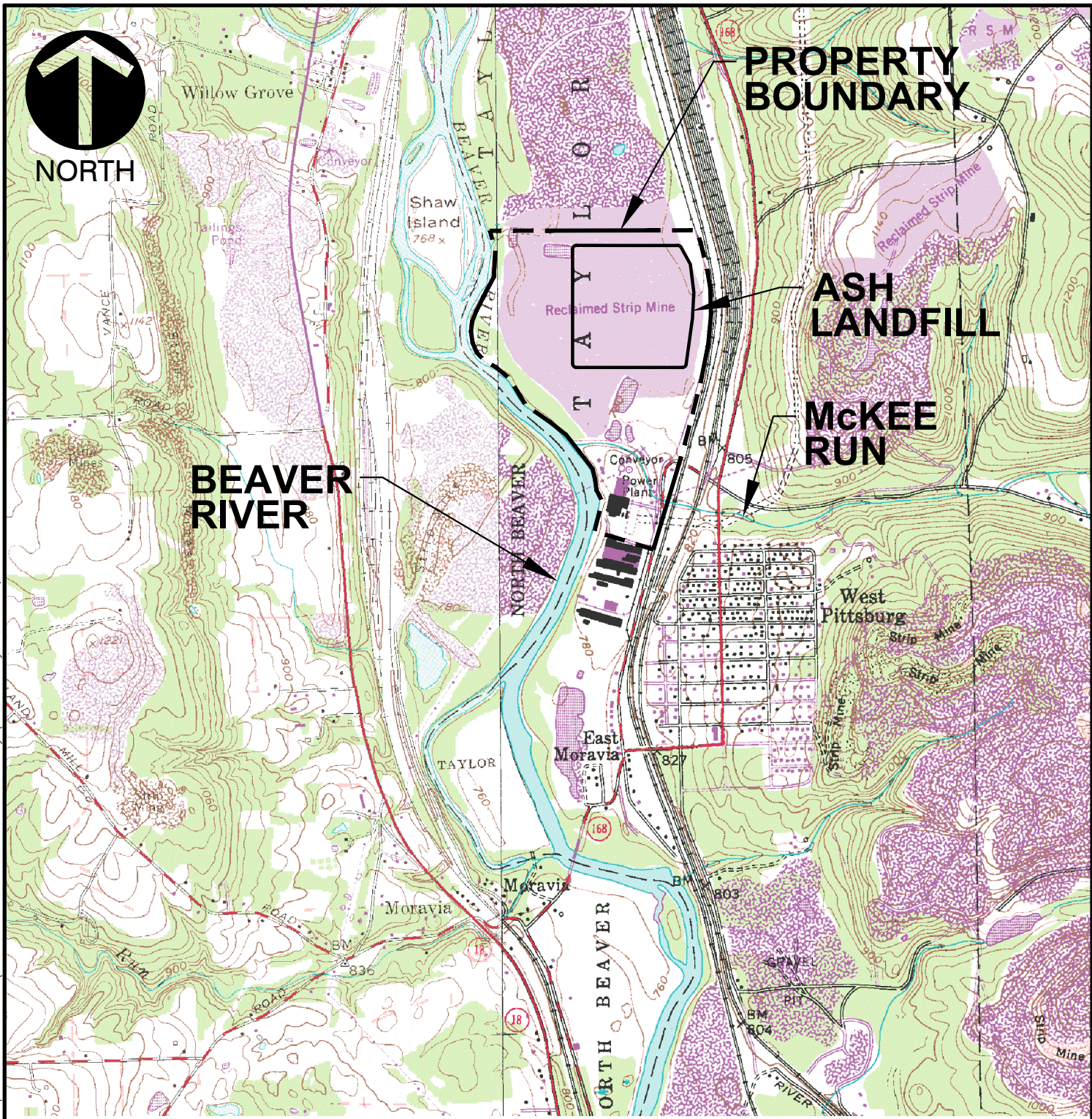


October 2016

APPENDIX B

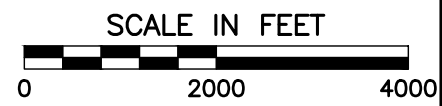
DRAWINGS

P:\2010\100-063\CADD\DWG\TASK 0002 - PT1\DWG\100-0634001.DWG\LOCATION MAP 2010 PERMIT DWGS\ (PBRINKLEY) - AUG 2, 2010 - 10:2:28



REFERENCE

U.S.G.S 7.5 MIN. TOPOGRAPHIC QUADRANGLE NEW CASTLE SOUTH, PA (PHOTOREVISED 1990) BESSEMER, PA (PHOTOREVISED 1990)



* HAND SIGNATURE ON FILE



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NRG POWER MIDWEST LP
 NEW CASTLE STATION ASH LANDFILL
 WEST PITTSBURG
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SITE LOCATION MAP

DRAWN BY:	DWD	CHECKED BY:	AMR	APPROVED BY:	RJB*	FIGURE NO.:	1
DATE:	9/23/2016	DWG SCALE:	1"=2000'	PROJECT NO:	154-531.0003		

