



Coal Combustion Residuals Annual CCR Unit Inspection Report for Reporting Year 2022

Keystone-Conemaugh Projects, LLC
Keystone Station Ash Disposal Site
Keystone Generating Station
Shelocta, Pennsylvania

GAI Project Number: C151611.07, Task 003
January 2023



Prepared by: GAI Consultants, Inc.
Pittsburgh Office
385 East Waterfront Drive
Homestead, Pennsylvania 15120-5005

Prepared for: Keystone-Conemaugh Projects
Keystone Generating Station
313 Keystone Drive
Shelocta, Pennsylvania 15774-2305

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Report Author:

James F. Shields, PE
Assistant Engineering Manager

Taylor Boring
Civil Technical Specialist

Professional Engineer's Certification

In accordance with §257.84(b) of the Rule, I hereby certify based on a review of available information within the facility's operating records and observations from my personal on-site inspection (including the photographs contained in Appendix A), that the Keystone Ash Disposal Site does not exhibit any appearances of actual/potential structural weakness that would be disruptive to the normal operations of the East Valley and West Valley Coal Combustion Residual Units. Both units are being operated and maintained consistent with recognized and generally accepted good engineering standards and practices.

Name of Professional Engineer: James F. Shields

Company: GAI Consultants

Signature: _____

Date: _____

PE Registration State: Pennsylvania

PE Registration Number: PE-079511

Professional Engineer Seal:

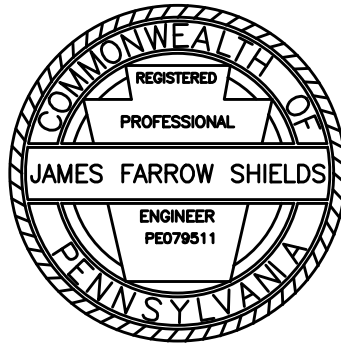


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1.0 Introduction

Title 40 Code of Federal Regulations (CFR) Part 257 addresses, in part, the management of Coal Combustion Residuals (CCR) Rule, or Rule in regulated units, including landfills. Specific to §257.84(b) of the Rule, existing and new CCR landfills must be inspected on an annual basis by a qualified professional engineer. For the Keystone-Conemaugh Projects' Keystone Generating Station, this inspection requirement applies to the existing Ash Disposal Site. In support of this obligation, Mr. James Shields (a qualified professional engineer with GAI Consultants, Inc. (GAI) conducted an on-site inspection of the Ash Disposal Site on November 8, 2022. The findings from this annual inspection are summarized in the remaining sections of this correspondence.

As required, this report will be placed in the Keystone facility's operating record per §257.105(g)(9), noticed to the State Director per §257.106(g)(7), and posted to the publicly accessible internet site per §257.107(g)(7). Placement of the prior annual inspection report into the facility's operating record was accomplished on January 16, 2022. Per §257.84(b)(4), the current report will be entered into the facility's operating record no later than January 16, 2023.

2.0 Background

The collective Ash Disposal Site consists of the contiguous East Valley and West Valley components and is operated/maintained in accordance with Pennsylvania Department of Environmental Protection (PADEP) Solid Waste Permit No. 300837. Stage I of East Valley was constructed first and became operational in 1985. Stage I was initially constructed in the northern part of East Valley, with Stage II being later constructed in the southern half of East Valley and piggy-backed over the Stage I area. West Valley comprises the currently active Stages III and IV of the disposal site. Disposal of CCR materials in West Valley began in 2002. When completed, West Valley will piggy-back over the western part of the East Valley Disposal Site. Stage IV of the disposal site (West Valley Expansion) is situated in the southern part of West Valley and represents a horizontal and vertical expansion of the Stage III area. The base liner of the initial Stage IVA has been constructed and disposal of CCR was occurring across the lined area at the time of inspection. When ultimate development conditions are reached, Stage IV will piggyback over Stage III as well as the western limits of East Valley (Stage II). At such time when the permitted disposal capacity has been fully expended and final grades attained, any uncapped areas of the disposal site will be capped and closed in accordance with the approved Closure Plan.

With respect to the Ash Disposal Site, GAI's evaluation has focused on the following items as outlined in §257.84(b)(1)(i-ii):

- ▶ a review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record; and
- ▶ a visual inspection of the CCR unit to identify signs of distress or malfunction.

Specific to GAI's preparation of the annual inspection report, and per §257.84(b)(2)(i-iv), the following aspects have been addressed:

- ▶ any changes in geometry of the structure since the previous annual inspection;
- ▶ the approximate volume of CCR contained in the unit at the time of the inspection;
- ▶ any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit; and
- ▶ any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.

3.0 Operating Records Review

Principal items reviewed as part of this year's inspection included, but were not limited to: Design Drawings, Weekly and Periodic Landfill Inspection Reports that have been completed since the 2021 Inspection, 2021 Annual Landfill Operations Report, and Solid Waste Permit No. 300837. During the weeks leading up to the site inspection, Mr. Shields interviewed facility personnel (Mr. Nate Rozic) to verify the information contained within the operating record.

3.1 Environmental Control System Overview

3.1.1 Bottom Liner System

- ▶ East Valley is underlain by a single synthetic liner system.
- ▶ West Valley has a double-synthetic liner system with one component containing a geosynthetic clay liner.

3.1.2 Leachate Collection System

- ▶ The East Valley and West Valley leachate collection systems are represented by piping networks located above the liner system. East Valley leachate is routed to the existing East Valley Pump Station and then pumped to the station's Industrial Wastewater Treatment (IWT) plant. West Valley leachate flows by the small west-side pump station and primarily by gravity to the IWT. Following processing at the IWT and eventually at the Final Wastewater Treatment (FWT) plant, the treated effluent is discharged in accordance with the station's National Pollutant Discharge Elimination System (NPDES) Permit.

3.1.3 Stormwater Management

- ▶ "Contact" stormwater at the West Valley is collected in the West Valley Equalization Pond to allow for solids settling and is then routed to the IWT for treatment.
- ▶ Non-contact stormwater at both East Valley and West Valley is routed to dedicated NPDES-permitted outfalls for direct discharge to surface water.

3.2 Summary of Landfill Construction

Since the time of the last site inspection, disposal of CCR is progressively being spread across the lined area in primarily the remaining active area of the West Valley Stage III and to a lesser degree in the West Valley Stage IVA Expansion Area.

3.3 Review of Prior Inspections

Weekly inspections: A review of weekly inspections has concluded that no significant deficiencies occurred at the facility that required remedial actions.

Annual inspections: The previous annual inspection report determined that there were no deficiencies or releases, actual or potential structural weaknesses, or concern to the stability of the landfill. All environmental control systems were in good operating condition and functioning as intended.

3.4 CCR Disposal

Based on information provided in the Annual Operations Report, the total in-place disposal quantity of CCR materials as of 2021 was estimated at approximately 30,512,881 cubic yards (cy). At the end of December 2022, approximately 186,622 cy of additional materials will have been disposed. Therefore, the approximate total CCR disposal quantity at the end of 2022 is 30,699,503 cy.

4.0 Site Inspection

The site inspection was performed on November 8, 2022 by Mr. Shields and Ms. Boring. The inspection focused on identification of any standard geotechnical signs of distress or malfunction. Specific aspects such as slumping at the toe of slope, tensile cracking, abnormal or excessive erosion on the side slopes, slope bulging, and groundwater/surface water seepage or ponding were assessed. If present, these readily visible signs are potential indicators of structural weakness of the CCR Landfill unit.

4.1 Visual Signs of Distress or Malfunction

As noted above, a previous leachate seep was observed at the toe of East Valley in March 2019. The leachate seep has since been mitigated. No signs of geotechnical distress or environmental impact were observed at the former seep location at the time of the 2022 inspection. No visual signs of distress or malfunction were observed elsewhere at East Valley or West Valley during the inspection. Stormwater drainage features, slope appearance and stability, leachate conveyance mechanisms, and overall site conditions were assessed. Closed and intermediate cover areas of East Valley and West Valley exhibited well established vegetation.

4.2 Review of Environmental Control Systems

Except as noted, and with no evidence to the contrary, the bottom liner systems in East Valley and West Valley are believed to be in good operating condition and functioning as intended. At the time of the inspection, the collection and conveyance systems to the IWT were operating as designed.

4.3 Review of Previously Recommended Actions

In 2019, it was recommended that the leachate seep elevations should be monitored on a weekly basis (or as recommended by the engineers overseeing the seep mitigation) to evaluate landfill stability in the leachate seep area during mitigation activities. Additional stability evaluations were also recommended to be completed if leachate elevations continued to rise.

Based on a review of inspection records and discussions with site personnel, GAI concludes that monitoring of the 2019 seep, including leachate elevations, was appropriately completed as recommended. The seep has been resolved with no further action required, other than ongoing monitoring.

No other corrective actions were required based on the findings of the 2021 Annual Inspection. Recommendations were limited to the continued operation and maintenance of the facility and maintaining access to closed portions of the landfill for inspection purposes. These recommendations were found to have been followed, based on site conditions and the review of weekly inspection logs.

5.0 Conclusions

5.1 Changes in Geometry

There have been no significant changes in geometry of the disposal site since the last inspection. CCR material placement has progressed in vertical elevation within the active Stage III and IVA disposal areas of West Valley throughout this year.

5.2 In-Place CCR Disposal Quantities

The total permitted disposal capacity for the combined East Valley and West Valley areas is 49,926,000 cy. The approximate total CCR disposal quantity at the end of 2022 is 30,699,503 cy.

5.3 Appearance of an Actual or Potential Structural Weakness of the CCR Unit

At the time of inspection, there were no signs of distress or malfunction that would indicate actual or potential structural weakness at East Valley or West Valley.

5.4 Changes that may Affect the Stability or Operation of the CCR Unit

There have been no changes to the East Valley or West Valley areas that pose a threat or concern to the stability of the landfill.

6.0 Recommendations

1. Continue operation and maintenance in the active areas as currently performed.
2. Ensure adequate access to the closed portions of the landfill to maintain the ability to perform weekly visual site structural inspections.

There were no deficiencies or releases identified during the annual inspection that required the owner or operator to perform corrective actions as required under §257.84(b)(5).

FIGURE

APPENDIX A Photographs



Photograph 1. Stage IV collection channel to West Valley Equalization Pond and Stage IV toe in background, view north.



Photograph 2. West Valley Equalization Pond, view southwest.



Photograph 3. West Valley Leak Detection and Leachate Collection Box.



Photograph 4. Northwest view of the East Valley south facing benches.



Photograph 5. East Valley Leachate Collection Box, view west.



Photograph 6. East Valley Collection Channel at toe area, view east.



Photograph 7. View of East Valley Toe Bench and Leachate Seep Collection Pipes and Cleanouts added in 2019, view north.



Photograph 8. East Valley Toe and east facing benches, view west.



Photograph 9. View north of idled East Valley Equalization Ponds.



Photograph 10. East Valley east facing benches, view south.



Photograph 11. East Valley collection channel, view west.



Photograph 12. East Valley east facing benches, view south.



Photograph 13. East Valley east facing benches and Stage I/II collection channel, view north.



Photograph 14. Stage I/II revegetated top surface drainage swale, north end.



**Photograph 15. Foreground – Stage 1 west facing benches and leachate pipe cleanout.
Background – Stage III west facing benches.**



Photograph 16. West Valley Stage III Diversion Channel, view north.



Photograph 17. Stage III Haul Road and view of the East Valley Benches, view southeast.



Photograph 18. West Valley Stage IV, view southwest.



Photograph 19. West Valley Stage IV, view southeast.



Photograph 20. Eastern side of active West Valley Stage III, view south.



Photograph 21. East Valley Slope Drain, view east from Stage III top.



Photograph 22. North end of revegetated Stage III top.



Photograph 23. Active top of West Valley Stage III.



Photograph 24. West Valley Stage III haul road and benches.



Photograph 25. Gypsum being loaded out of a stockpile in Stage IV for beneficial use.



Photograph 26. West Valley Stage IV and haul road collection channel, view south.



Photograph 27. View of the West Valley Stage IV toe access road, view west.