Inspection Report

To:	**Nate Rozic (Keystone Generating Station)**
From:	**Richard Southorn, P.E., P.G.**
Re:	**Keystone Ash Disposal Site – Annual CCR Unit Inspection Report**
Inspection Date:	**November 11, 2020**
Report Date:	**January 15, 2021**

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, LLC-Keystone Generating Station, this inspection requirement applies to the existing Ash Disposal Site. In support of this obligation, Mr. Richard Southorn (a qualified professional engineer with Aptim Environmental & Infrastructure, LLC [APTIM]) conducted an on-site inspection of the Ash Disposal Site on November 11, 2020. 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, 2020. Per §257.84(b)(4), the current report will be entered into the facility's operating record no later than January 16, 2021.

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 Stage IV has been constructed; bottom ash was being installed across the base liner at the time of inspection. The bottom ash serves as a protective layer and will facilitate leachate drainage at the base of the landfill. When ultimate development conditions are reached, Stage IV will piggy-

back over Stage III as well as the western limits of East Valley (Stage I and 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, APTIM'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 APTIM'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.*

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 2019 Inspection, 2019 Annual Landfill Operations Report, and Solid Waste Permit No. 300837. During the site inspection, Mr. Southorn interviewed facility personnel (Mr. Nate Rozic) to verify the information contained within the operating record.

Environmental Control System Overview

i. Bottom Liner System

   a. East Valley is underlain by a single synthetic liner system.

   b. West Valley has a double-liner system with one component being a geosynthetic clay liner.

ii. Leachate Collection System

a. 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 Pump Station and then pumped to the station's Industrial Wastewater Treatment (IWT) plant. West Valley leachate flows by a pump station and 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.

iii. Stormwater Management

a. "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.

b. Non-contact stormwater at both East Valley and West Valley is routed to dedicated NPDES-permitted outfalls for direct discharge to surface water.

Summary of Landfill Construction

Since the time of the last site inspection, bottom ash is progressively being spread across the composite liner in the West Valley Stage IV Expansion Area. CCR disposal occurred in the remaining active areas of West Valley Stage III and in Stage IV.

Review of Site Operating Record

In 2019, a leachate seep was identified at the East Valley on the first bench near the eastern toe. Mitigation activities were completed in 2019/2020, with summary reports prepared and provided to PADEP. These activities have been deemed appropriate and complete by PADEP and no further mitigation is required. It is the opinion of APTIM's certifying engineer that the landfill has remained stable during and after mitigation activities.

Review of Prior Inspections

Weekly inspections: Other than the leachate seep as noted above, a review of weekly inspections has concluded that no significant deficiencies occurred at the facility that required remedial actions.

Annual inspections: Other than the seep identified above, 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 land form. All environmental control systems were in good operating condition and functioning as intended.

CCR Disposal

Based on information provided by Station personnel, the total in-place disposal quantity of CCR materials as of December 2019 was estimated at approximately 29,818,340 cubic yards (cy). At the end of December 2020, approximately 266,361 cy of additional materials have been disposed. Therefore, the approximate total CCR disposal quantity at the end of 2020 is 30,084,701 cy.

SITE INSPECTION

The site inspection was performed on November 11, 2020 by Mr. Southorn. The inspection focused on identification of 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.

Visual Signs of Distress or Malfunction

As noted above, a 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 2020 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 exhibited well established vegetation.

Review of Environmental Control Systems

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

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 ensure 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, APTIM concludes that monitoring of the 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 2019 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.

CONCLUSIONS

Changes in Geometry

CCR material placement has progressed in the active Stage III and IV disposal areas of West Valley throughout this year.

In-Place CCR Disposal Quantities

The total permitted disposal capacity for the combined East Valley and West Valley areas is 49,926,600 cy. The approximate total CCR disposal quantity at the end of 2020 is 30,084,701 cy.

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.

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 land form.

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).

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 Attachment 2), 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 CCR Units. Both units are being operated and maintained consistent with recognized and generally accepted good engineering standards and practices.

Certified by: _____

Date: January 15, 2021

Richard Southorn, P.E., P.G.
Professional Engineer Registration No. PE085411
Aptim Environmental & Infrastructure, LLC

ATTACHMENTS

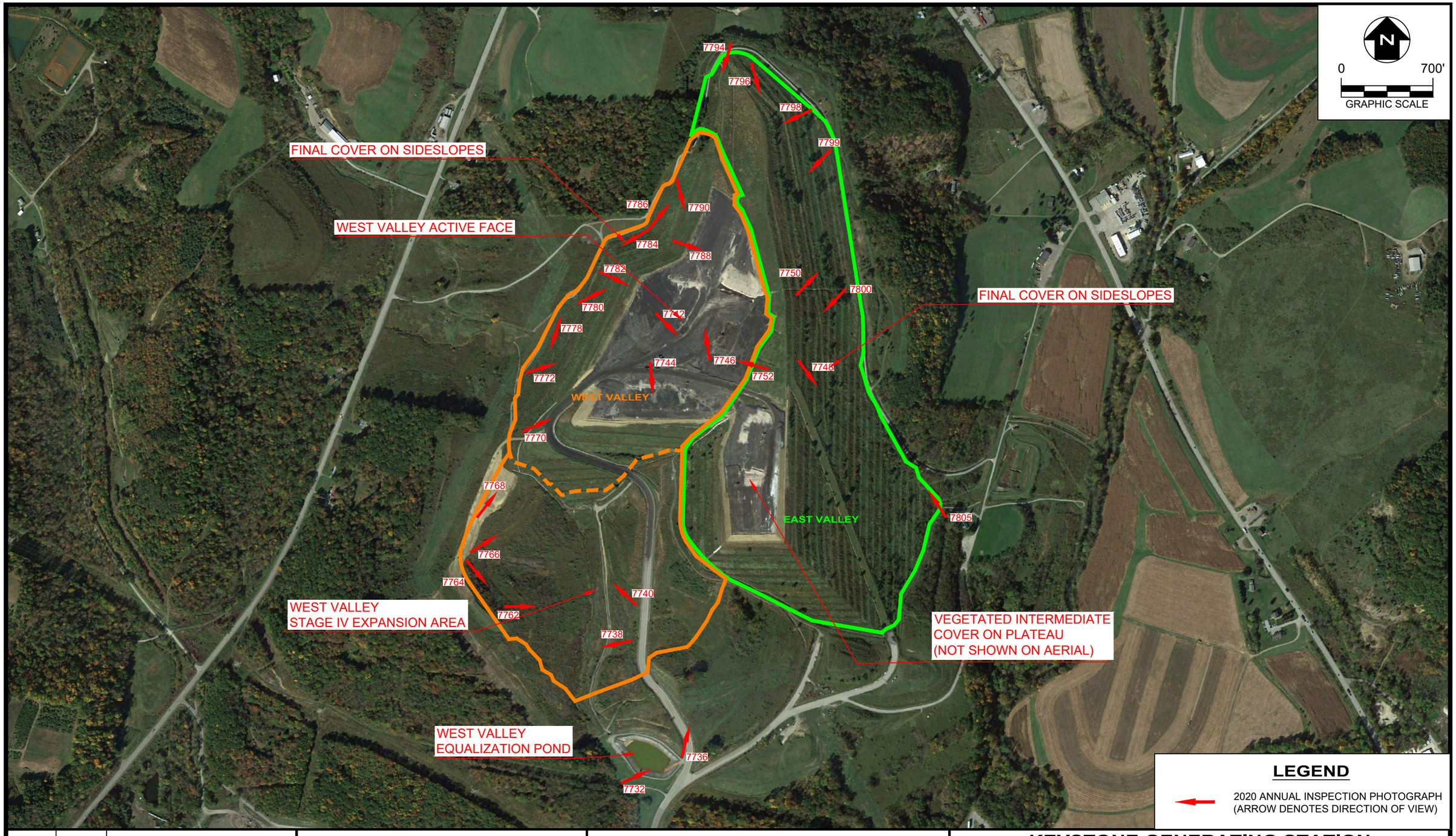
1. Site Map
2. Inspection Photo Log

REFERENCES

1. Residual Waste Major Permit Modification, Keystone Station Disposal Site, July 1996.
2. 2019 Keystone Generating Station Annual Landfill Operations Report.
3. Leachate seep documentation in Operating Record.
4. Weekly and Periodic Landfill Inspection Reports Nov 2019 – Nov 2020.
5. 40 Code of Federal Regulations, Part 257.

Attachment 1

Site Map



REV. NO.	DATE	DESCRIPTION

APTIM Environmental & Infrastructure, LLC

KEYSTONE GENERATING STATION
SHELOCTA, PENNSYLVANIA

PHOTOGRAPH LOCATION MAP

DRAWN BY:	APPROVED BY:	PROJ. NO.:	DATE:
BWM	RDS	631004162	DECEMBER 2020

Attachment 2

Photo Log

Project: Keystone Landfill 2020 Annual Inspection
Photographer: Richard Southorn

Image: 7732 Date: 11/11/2020 Time: 8:02 AM Direction: Northeast Description: West Valley Equalization Pond. Well maintained. Minor sediment buildup in pond.	

Image: 7736 Date: 11/11/2020 Time: 8:07 AM Direction: North Description: Non-contact stormwater ditch lined with revetment matting. Free of obstructions.	

Project: Keystone Landfill 2020 Annual Inspection
Photographer: Richard Southorn

Image: 7738 Date: 11/11/2020 Time: 8:07 AM Direction: West-Southwest Description: Bottom ash being spread over West Valley Expansion Area as protective cover over bottom liner system.	

Image: 7740 Date: 11/11/2020 Time: 8:07 AM Direction: Northwest Description: Bottom ash being spread over West Valley Expansion Area as protective cover over bottom liner system.	

Project: Keystone Landfill 2020 Annual Inspection
Photographer: Richard Southorn

Image: 7742 Date: 11/11/2020 Time: 8:11 AM Direction: Southeast Description: Bottom ash at West Valley active face.	

Image: 7744 Date: 11/11/2020 Time: 8:12 AM Direction: South Description: West Valley active area. Compacted and graded to prevent ponding water.	

Project: Keystone Landfill 2020 Annual Inspection
Photographer: Richard Southorn

Image: 7746 Date: 11/11/2020 Time: 8:13 AM Direction: North Description: West Valley active area. Compacted and graded to prevent ponding water.	

Image: 7748 Date: 11/11/2020 Time: 8:13 AM Direction: Southeast Description: Final cover on sideslopes of East Valley. The vegetation is dense, healthy, and uniformly distributed. The final cover slopes show no evidence of erosion, animal burrows, or failure (e.g. sloughing or sliding).	

Project: Keystone Landfill 2020 Annual Inspection
Photographer: Richard Southorn

Image: 7750 Date: 11/11/2020 Time: 8:14 AM Direction: Northeast Description: Final cover on sideslopes of East Valley. The vegetation is dense, healthy, and uniformly distributed. The final cover slopes show no evidence of erosion, animal burrows, or failure (e.g. sloughing or sliding).	

Image: 7752 Date: 11/11/2020 Time: 8:17 AM Direction: West-Northwest Description: West Valley active area. Compacted and graded to prevent ponding water	

Image: 7762 Date: 11/11/2020 Time: 8:28 AM Direction: East Description: Bottom ash being spread over West Valley Expansion Area as protective cover over bottom liner system.	

Image: 7764 Date: 11/11/2020 Time: 8:28 AM Direction: Southeast Description: Bottom ash being spread over West Valley Expansion Area as protective cover over bottom liner system. The landfill will eventually be developed over the vegetation shown.	

Image: 7766 Date: 11/11/2020 Time: 8:28 AM Direction: Northeast Description: Bottom ash being spread over West Valley Expansion Area as protective cover over bottom liner system. The landfill will eventually be developed over the vegetation shown.	

Image: 7768 Date: 11/11/2020 Time: 8:30 AM Direction: Northeast Description: A West Valley non-contact stormwater channel that is lined with revetment mat. The channel is free of obstructions and appears in good condition.	

Image: 7770 Date: 11/11/2020 Time: 8:31 AM Direction: Northeast Description: Final cover on sideslopes of West Valley. The vegetation is dense, healthy, and uniformly distributed. The final cover slopes show no evidence of erosion, animal burrows, or failure (e.g. sloughing or sliding).	

Image: 7772 Date: 11/11/2020 Time: 8:32 AM Direction: Northeast Description: West Valley leachate cleanout access. No damage observed.	

Project: Keystone Landfill 2020 Annual Inspection
Photographer: Richard Southorn

Image: 7778 Date: 11/11/2020 Time: 8:34 AM Direction: South Description: Final cover on sideslopes of West Valley. The vegetation is dense, healthy, and uniformly distributed. The final cover slopes show no evidence of erosion, animal burrows, or failure (e.g. sloughing or sliding).	

Image: 7780 Date: 11/11/2020 Time: 8:35 AM Direction: Northeast Description: Final cover on sideslopes of West Valley. The vegetation is dense, healthy, and uniformly distributed. The final cover slopes show no evidence of erosion, animal burrows, or failure (e.g. sloughing or sliding).	

Project: Keystone Landfill 2020 Annual Inspection
Photographer: Richard Southorn

Image: 7782 Date: 11/11/2020 Time: 8:36 AM Direction: Southeast Description: West Valley Edge-of-Liner marker in foreground and leachate cleanout access in background.	

Image: 7784 Date: 11/11/2020 Time: 8:36 AM Direction: Southwest Description: Final cover on sideslopes of West Valley. The vegetation is dense, healthy, and uniformly distributed. The final cover slopes show no evidence of erosion, animal burrows, or failure (e.g. sloughing or sliding).	

Project: Keystone Landfill 2020 Annual Inspection
Photographer: Richard Southorn

Image: 7786 Date: 11/11/2020 Time: 8:36 AM Direction: Northeast Description: Final cover on sideslopes of West Valley. The vegetation is dense, healthy, and uniformly distributed. The final cover slopes show no evidence of erosion, animal burrows, or failure (e.g. sloughing or sliding).	

Image: 7788 Date: 11/11/2020 Time: 8:37 AM Direction: East-Southeast Description: Final cover on sideslopes of West Valley. The vegetation is dense, healthy, and uniformly distributed. The final cover slopes show no evidence of erosion, animal burrows, or failure (e.g. sloughing or sliding).	

Image: 7790 Date: 11/11/2020 Time: 8:38 AM Direction: South Description: West Valley leachate cleanout access. No damage observed.	

Image: 7794 Date: 11/11/2020 Time: 8:40 AM Direction: South-Southwest Description: Access road to West Valley/East Valley boundary.	

Image: 7796 Date: 11/11/2020 Time: 8:42 AM Direction: South-Southeast Description: Final cover on sideslopes of East Valley. The vegetation is dense, healthy, and uniformly distributed. The final cover slopes show no evidence of erosion, animal burrows, or failure (e.g. sloughing or sliding).	

Image: 7798 Date: 11/11/2020 Time: 8:43 AM Direction: Southwest Description: Final cover on sideslopes of East Valley. The vegetation is dense, healthy, and uniformly distributed. The final cover slopes show no evidence of erosion, animal burrows, or failure (e.g. sloughing or sliding).	

Project: Keystone Landfill 2020 Annual Inspection
Photographer: Richard Southorn

Image: 7799 Date: 11/11/2020 Time: 8:44 AM Direction: Southwest Description: Final cover on sideslopes of East Valley. The vegetation is dense, healthy, and uniformly distributed. The final cover slopes show no evidence of erosion, animal burrows, or failure (e.g. sloughing or sliding).	

Image: 7800 Date: 11/11/2020 Time: 8:45 AM Direction: Southwest Description: Final cover on sideslopes of East Valley. The vegetation is dense, healthy, and uniformly distributed. The final cover slopes show no evidence of erosion, animal burrows, or failure (e.g. sloughing or sliding).	

Project: Keystone Landfill 2020 Annual Inspection
Photographer: Richard Southorn

Image: 7805 Date: 11/11/2020 Time: 8:56 AM Direction: North-Northwest Description: Location of former leachate seep that has been appropriately remediated.