Inspection Report

To:	**Steve Brown (New Castle Generating Station)**
From:	**Richard Southorn, P.E., P.G.**
Re:	**New Castle Plant Ash Landfill–Annual CCR Unit Inspection Report**
Inspection Date:	**October 23, 2018**
Report Date:	**January 16, 2019**

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 New Castle Generating Station (operated by NRG Power Midwest LP), this inspection requirement applies to the existing New Castle Plant Ash Landfill (Ash Landfill). In support of this obligation, Mr. Richard Southorn (a qualified professional engineer with Aptim Environmental & Infrastructure, Inc. [APTIM]) conducted an on-site inspection of the Ash Landfill on October 23, 2018. The findings from this annual inspection are summarized in the remaining sections of this correspondence.

As required, this report will be placed in the New Castle 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 18, 2018. Per §257.84(b)(4), the current report will be entered into the facility's operating record no later than January 18, 2019.

BACKGROUND

The Ash Landfill is situated north of the main generating station. Prior to landfill development in this portion of the property, an impoundment existed (occupying an area of approximately 120 acres) that was used for the disposal of sluiced fly ash and bottom ash; these operations took place from approximately 1939 to 1978. From 1978 to 1984 and following the installation of electrostatic precipitators at the station, "dry" fly ash was disposed on the dewatered impoundment area. Beginning in 1984, CCR materials (including "dry" fly ash and dredged bottom ash) have been placed in this area.

In 1997, the Pennsylvania Department of Environmental Protection (PADEP) issued Solid Waste Permit No. 300818 for the Ash Landfill, addressing Stages 1, 2, and 3A. In April 2008, a permit modification was issued for Stages 4, 5, 6, and 7, which together comprise a vertical expansion of the Ash Landfill over top of the previously PADEP permitted stages.

From 2008 through 2010, approximately 16.8 acres of layover liner system (liner between Stages 4 and underlying Stages 1, 2, and 3A) was placed within Stage 4. Approximately 17.9 acres of

final cover cap liner system was installed over the lower landfill slopes (southern and eastern perimeters) in 2008/2009; approximately 11.6 acres installed over Stage 1, 2, and/or 3A beneath the area designated for Stage 5 (not active) in 2010; and approximately 10.2 acres installed over Stage 1, 2, and/or 3A beneath the area designated for Stage 6 (not active) in 2013. Therefore, Stages 1, 2, and 3A were entirely capped and/or closed by 2013 with the layover liner system installation in Stage 4 and final cover cap placement in the areas designated for Stages 5 and 6.

Stage 4 is currently the active disposal area. The currently permitted Ash Landfill occupies an area of approximately 60 acres (see Figure in Attachment 1), and is operated/maintained in accordance with Permit No. 300818.

In June 2016, the New Castle Generating Station successfully completed a natural gas addition project and began operating with this new fuel source (the ability to run on coal has still been maintained). As a result, disposal of CCR materials in the Stage 4 area has been significantly reduced since approximately May 2016. In 2017, intermediate cover was installed over the majority of the previous active face of Stage 4.

With respect to the Ash Landfill, 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, 2017/2018 Weekly and Periodic Landfill Inspection Reports that have been completed since the 2017 inspection, 2017 Annual Landfill Operations Report, and Solid Waste Permit No. 300818. During the site inspection, Mr. Southorn interviewed facility personnel (Mr. Steve Brown) to verify the information contained within the operating record.

Environmental Control System Overview

i. Bottom Liner System

a. The active disposal area overlies the previous disposal areas (Stages 1, 2, and 3A). An over liner consisting of the subbase layer, geosynthetic clay liner, and an engineered 60-mil textured HDPE geomembrane with a geocomposite drainage layer and leachate detection system was installed above Stages 1, 2, and 3A prior to placement of CCR materials in Stage 4. The top of Stages 1, 2, and 3A that was beneath the designated areas of Stages 5 and 6 was capped using two feet of final cover soil with vegetative cover; double-sided bonded geocomposite consisting of 220-mil geonet and 6 oz. geonet drainage layer; a 40-mil textured HDPE flexible membrane liner; and compacted subgrade.

ii. Leachate Collection System

a. An underdrain system is used to collect leachate from the Ash Landfill; leachate collected in the underdrain system is routed to the Leachate Pond via dedicated perimeter ditches. From the Leachate Pond, the flows are discharged to the Beaver River via Outfall 009 in accordance with the New Castle Station's National Pollutant Discharge Elimination System (NPDES) Permit. There is a leachate leak detection system in place, located beneath the over liner.

iii. Stormwater Management

a. "Non-contact" stormwater and surface water is drained downslope. The slopes drain to perimeter stormwater ditches (separate from the leachate ditches) which convey the water to a Sedimentation Pond. From this pond, the waters are discharged to the Beaver River via NPDES-permitted Outfall 006.

b. "Contact" stormwater from within the active disposal area is collected in the leachate underdrain system and routed to the Leachate Pond as described above.

iv. Cover System

a. All perimeter slopes, as well as the plateaus of Stages 5 and 6, have a final cover installed and established vegetation where final cover is present.

b. The majority of Stage 4 has intermediate cover installed.

Summary of Landfill Construction

i. No construction activity was completed in 2018 other than routine maintenance activities. The intermediate cover that was installed over Phase 4 during 2017 has achieved full coverage.

ii. The active disposal area (Stage 4) received approximately 4,539 tons of CCR materials in 2018. As a result, the geometry of Stage 4 has not been significantly modified.

Review of Prior Inspections

i. Weekly inspections: A review of weekly inspections has concluded that no significant deficiencies occurred at the facility that required remedial actions. Animal burrows are occasionally noted on inspection reports, but are addressed through backfilling in a timely manner.

ii. Annual inspections: A review of the previous annual inspection report has 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

i. Based on review of the 2017 Annual Landfill Operations Report and disposal quantities provided by Station personnel, the total in-place disposal quantity of CCR materials is estimated at approximately 1,378,457 tons (1,373,918 at end of year 2017 plus 4,539 tons in 2018).

SITE INSPECTION

The site inspection was performed on October 23, 2018 by Mr. Southorn, and during which time efforts were 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, 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

No visual signs of distress or malfunction were observed during the inspection. Stormwater drainage features, slope appearance and stability, leachate conveyance mechanisms, and overall site conditions were assessed. Capped portions of the Ash Landfill exhibited well established vegetative cover. The vegetation on intermediate cover of Stage 4 appears healthy with full coverage.

Review of Environmental Control Systems

With no evidence to the contrary, the bottom liner system at the active Stage 4 disposal area is believed to be in good operating condition and functioning as intended. At the time of the inspection, leachate and stormwater conveyance systems were operating as designed. A leachate leak detection pipe was reviewed during the inspection and was not flowing, indicating that the bottom liner system is not leaking.

Review of Previously Recommended Actions

2017 Inspection Recommendation No. 1: Continue to fill any animal burrows or holes observed during weekly inspections to prevent instability.

2018 Finding: Animal burrows are being identified during weekly inspections and being filled as appropriate.

2017 Inspection Recommendation No. 2: Monitor the vegetation on the Stage 4 intermediate cover for improved coverage.

2018 Finding: The vegetation has achieved full coverage.

2017 Inspection Recommendation No. 3: Ensure adequate access to the closed portions of the landfill to maintain the ability to perform weekly visual site structural inspections.

2018 Finding: The closed portion is accessible. Weekly site structural inspections have been completed appropriately.

2017 Inspection Recommendation No. 4: Continue operations and maintenance of stormwater drainage features and leachate collection systems.

2018 Finding: All stormwater drainage features, leachate discharge pipes, and conveyance channels were free of obstruction and functioning as intended.

CONCLUSIONS

Changes in geometry

During the previous annual inspection, CCR materials were being placed within the active disposal area at approximate elevations ranging between 829 and 840 feet mean sea level. No significant changes have been made to the geometry of the Ash Landfill site since the previous annual inspection.

In-Place CCR Disposal Quantities

As previously the total in-place disposal quantity of CCR materials is estimated at approximately 1,378,457 tons (1,373,918 at end of year 2017 plus 4,539 tons in 2018).

Appearances of an Actual or Potential Structural Weakness of CCR Unit

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

Changes that may affect the stability or operation of the CCR Unit

There have been no changes to the Ash Landfill area that pose a threat or concern to the stability of the land form.

RECOMMENDATIONS

1. Continue to fill any animal burrows or holes observed during weekly inspections to prevent instability.

2. Ensure adequate access to the closed portions of the landfill to maintain the ability to perform weekly visual site structural inspections.

3. Continue operations and maintenance of stormwater drainage features and leachate collection systems.

There were no deficiencies or releases identified during the 2018 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 New Castle Plant Ash Landfill does not exhibit any appearances of actual/potential structural weakness that would be disruptive to the normal operations of the CCR Unit. The unit is being operated and maintained consistent with recognized and generally accepted good engineering standards and practices.

Certified by: RICHARD SOUTHORN

Date: JAN 16, 2019

1/16/19

LICENSE EXPIRES
9/30/19

Richard Southorn, P.E., P.G.

Professional Engineer Registration No. PE085411

Aptim Environmental & Infrastructure, Inc.

ATTACHMENTS

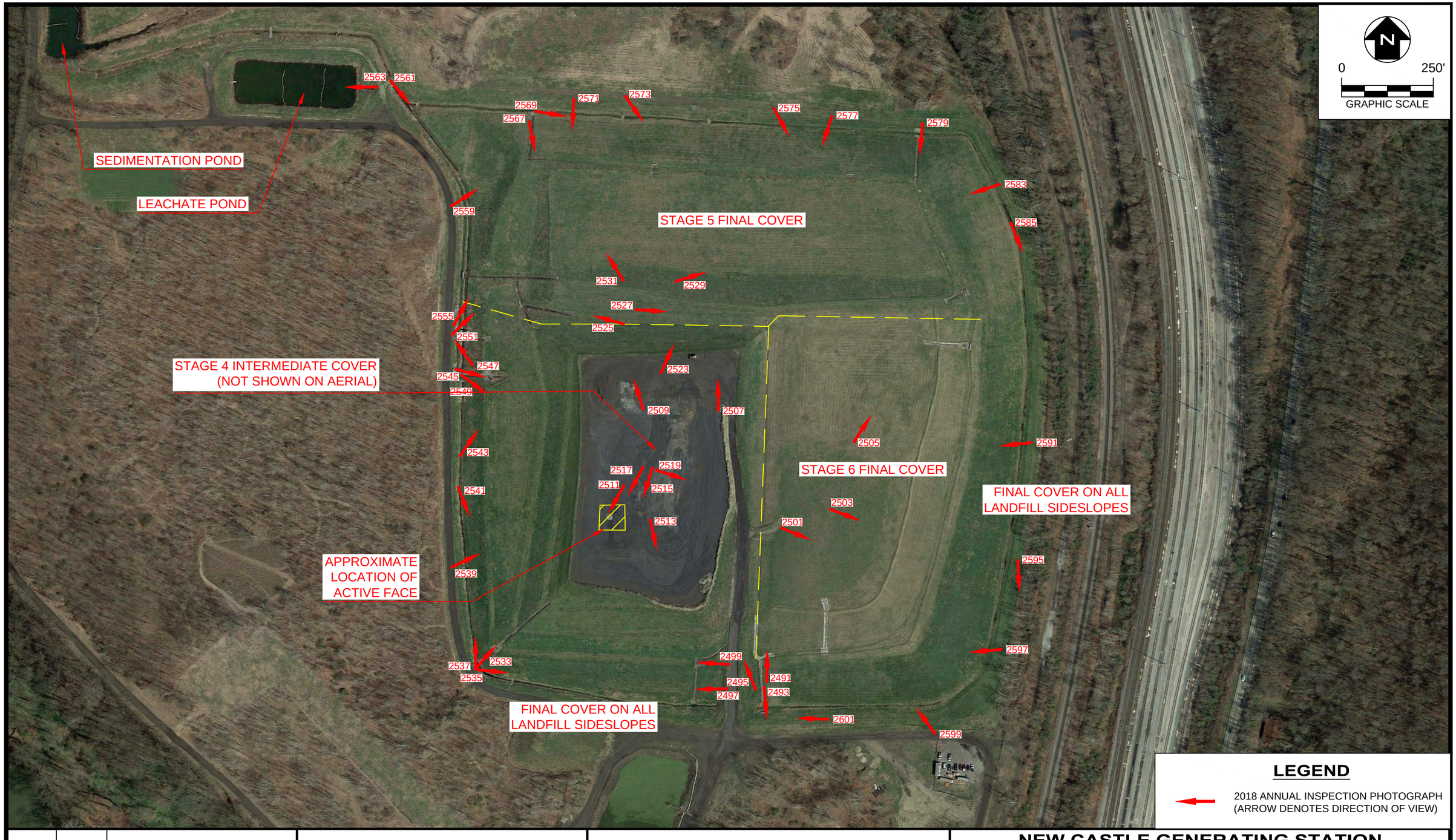
1. Site Map
2. Inspection Photo Log

REFERENCES

1. Application for Major Permit Modification and Permit Renewal, New Castle Plant Ash Landfill, April 2007 (including subsequent revisions).
2. PADEP Solid Waste Permit 300818, New Castle Plant Ash Landfill, April 23, 2008.
3. 2017 New Castle Generating Station Annual Landfill Operations Report.
4. Landfill Periodic Inspection Reports, November 2017-October 2018.
5. 40 Code of Federal Regulations, Part 257.

Attachment 1

Site Map



LEGEND

2018 ANNUAL INSPECTION PHOTOGRAPH
(ARROW DENOTES DIRECTION OF VIEW)

REV. NO.	DATE	DESCRIPTION

APTIM Environmental & Infrastructure, Inc.

NEW CASTLE GENERATING STATION
WEST PITTSBURG, PENNSYLVANIA

PHOTOGRAPH LOCATION MAP

DRAWN BY:	APPROVED BY:	PROJ. NO.:	DATE:
BWM	RDS	1009174011	DECEMBER 2018

Attachment 2

Photo Log

Project: New Castle 2018 Annual Inspection
Photographer: Richard Southorn

Image: 2491 Date: 10/23/2018 Time: 1:08 PM Direction: North Description: Non-contact stormwater downchute. Clear of obstructions. Revetment is in good condition. Functioning as intended.	

Image: 2493 Date: 10/23/2018 Time: 1:08 PM Direction: South Description: Non-contact stormwater downchute is clear of obstructions. Gabion energy dissipator is installed at the junction with the stormwater (non-contact water) perimeter ditch.	

Project: New Castle 2018 Annual Inspection
Photographer: Richard Southorn

Image: 2495 Date: 10/23/2018 Time: 1:08 PM Direction: North Description: Final cover sideslopes, recently mowed. Good condition, no evidence of animal burrows, erosion, or sloughing.	

Image: 2497 Date: 10/23/2018 Time: 1:09 PM Direction: West Description: Final cover sideslopes. Good condition, no evidence of animal burrows, erosion, or sloughing.	

Project: New Castle 2018 Annual Inspection
Photographer: Richard Southorn

Image: 2499 Date: 10/23/2018 Time: 1:09 PM Direction: West Description: Looking along a terrace berm where an area that experienced erosion was recently repaired.	

Image: 2501 Date: 10/23/2018 Time: 1:10 PM Direction: East Description: Stage 6 final cover. Vegetation is healthy and well maintained. No evidence of animal burrows, erosion, or stability.	

Project: New Castle 2018 Annual Inspection
Photographer: Richard Southorn

Image: 2503 Date: 10/23/2018 Time: 1:11 PM Direction: East Description: Stage 6 final cover. Vegetation is healthy and well maintained. No evidence of animal burrows, erosion, or stability.	

Image: 2505 Date: 10/23/2018 Time: 1:11 PM Direction: Northeast Description: Stage 6 final cover. Vegetation is healthy and well maintained. No evidence of animal burrows, erosion, or stability.	

Image: 2507 Date: 10/23/2018 Time: 1:13 PM Direction: North Description: CCR Material recently dredged from the North Ash Pond.	

Image: 2509 Date: 10/23/2018 Time: 1:14 PM Direction: North Description: Aggregate stockpile for vertical leachate riser.	

Project: New Castle 2018 Annual Inspection
Photographer: Richard Southorn

Image: 2511 Date: 10/23/2018 Time: 1:15 PM Direction: Southwest Description: Vertical leachate riser within active area. The ground is sloped to drain into this riser, with contact water treated as leachate.	

Image: 2513 Date: 10/23/2018 Time: 1:15 PM Direction: South Description: Stage 4 intermediate cover. Vegetation had only partially seeded during the 2017 inspection, but now has full coverage.	

Project: New Castle 2018 Annual Inspection
Photographer: Richard Southorn

Image: 2515 Date: 10/23/2018 Time: 1:16 PM Direction: South Description: Stage 4 active area. Well graded and compacted. No ponding water.	

Image: 2517 Date: 10/23/2018 Time: 1:16 PM Direction: Southwest Description: Stage 4 active area. Well graded and compacted. No ponding water.	

Image: 2519 Date: 10/23/2018 Time: 1:16 PM Direction: East Description: Stage 4 intermediate cover. Vegetation is fully established. No stability concerns evident.	

Image: 2523 Date: 10/23/2018 Time: 1:20 PM Direction: Northeast Description: Standing on Stage 4 intermediate cover looking north toward Stage 5 final cover. Stage 5 final cover vegetation is healthy and well established.	

Image: 2525 Date: 10/23/2018 Time: 1:21 PM Direction: West Description: Drainage swale at toe of Stage 4. Drainage swale is free of obstructions and well vegetated.	

Image: 2527 Date: 10/23/2018 Time: 1:21 PM Direction: East Description: Drainage swale at toe of Stage 4. Drainage swale is free of obstructions and well vegetated.	

Project: New Castle 2018 Annual Inspection
Photographer: Richard Southorn

Image: 2529 Date: 10/23/2018 Time: 1:22 PM Direction: East Description: Stage 5 final cover is in good condition.	

Image: 2531 Date: 10/23/2018 Time: 1:22 PM Direction: Northwest Description: Stage 5 final cover is in good condition.	

Image: 2533 Date: 10/23/2018 Time: 1:26 PM Direction: Northeast Description: Non-contact stormwater downchute is free of obstructions and in good condition.	

Image: 2535 Date: 10/23/2018 Time: 1:26 PM Direction: East Description: Non-contact stormwater ditch at corner of landfill. Ditch is in good condition, well lined with vegetation, and does not have any noted obstructions.	

Image: 2537 Date: 10/23/2018 Time: 1:26 PM Direction: North Description: Non-contact stormwater ditch at corner of landfill. Ditch is in good condition, well lined with vegetation, and does not have any noted obstructions.	

Image: 2539 Date: 10/23/2018 Time: 1:27 PM Direction: Northeast Description: Final Cover on Stage 4 sideslopes is in good condition with no evidence of damage from erosion, animals, or sloughing or stability issues.	

Image: 2541 Date: 10/23/2018 Time: 1:28 PM Direction: South Description: Non-contact stormwater ditch along Phase 4 is free of obstructions and does not exhibit scour or erosion issues.	

Image: 2543 Date: 10/23/2018 Time: 1:28 PM Direction: Northeast Description: Final Cover on Stage 4 sideslopes is in good condition with no evidence of damage from erosion, animals, or sloughing or stability issues.	

Project: New Castle 2018 Annual Inspection
Photographer: Richard Southorn

Image: 2545 Date: 10/23/2018 Time: 1:29 PM Direction: East Description: Non-contact stormwater downchute. Clear of obstructions. Revetment is in good condition. Functioning as intended.	

Image: 2547 Date: 10/23/2018 Time: 1:30 PM Direction: Northwest Description: Stormwater energy dissipator at toe of slope is functioning as intended.	

Image: 2549 Date: 10/23/2018 Time: 1:30 PM Direction: Southeast Description: Non-contact stormwater discharge pipe from upper bench into non-contact water ditch.	

Image: 2551 Date: 10/23/2018 Time: 1:31 PM Direction: Northeast Description: Leachate pipe (on left) discharging into contact water ditch, which ultimately flows to Leachate Pond. Leak detection pipe (on right) which was not flowing, demonstrating that the liner is not leaking. Ditch is clear of obstructions.	

Project: New Castle 2018 Annual Inspection
Photographer: Richard Southorn

Image: 2555 Date: 10/23/2018 Time: 1:32 PM Direction: Northeast Description: Non-contact water ditch exhibits no scour or erosion.	

Image: 2559 Date: 10/23/2018 Time: 1:33 PM Direction: Northeast Description: Final Cover on Stage 5 sideslopes is in good condition with no evidence of damage from erosion, animals, or sloughing or stability issues.	

Image: 2561 Date: 10/23/2018 Time: 1:34 PM Direction: Southeast Description: Stormwater ditch is in good working order.	

Image: 2563 Date: 10/23/2018 Time: 1:35 PM Direction: West Description: Inlet to Leachate Pond.	

Project: New Castle 2018 Annual Inspection
Photographer: Richard Southorn

Image: 2567 Date: 10/23/2018 Time: 1:37 PM Direction: South Description: Non-contact stormwater downchute. Clear of obstructions. Revetment is in good condition. Functioning as intended. Stage 5 final cover is in good condition with no signs of stability. No animal burrows noted. Vegetation is healthy.	

Image: 2569 Date: 10/23/2018 Time: 1:38 PM Direction: East Description: Stormwater swale is in good condition. Well maintained with healthy vegetation. No debris or obstructions.	

Project: New Castle 2018 Annual Inspection
Photographer: Richard Southorn

Image: 2571 Date: 10/23/2018 Time: 1:39 PM Direction: South Description: Stage 5 final cover is in good condition with no signs of stability. No animal burrows noted. Vegetation is healthy.	

Image: 2573 Date: 10/23/2018 Time: 1:39 PM Direction: Southeast Description: Stormwater swale is in good condition. Well maintained with healthy vegetation. No debris or obstructions.	

Project: New Castle 2018 Annual Inspection
Photographer: Richard Southorn

Image: 2575 Date: 10/23/2018 Time: 1:40 PM Direction: Southeast Description: Stage 5 final cover is in good condition with no signs of stability. No animal burrows noted. Vegetation is healthy.	

Image: 2577 Date: 10/23/2018 Time: 1:40 PM Direction: South Description: Stage 5 final cover is in good condition with no signs of stability. No animal burrows noted. Vegetation is healthy.	

Project: New Castle 2018 Annual Inspection
Photographer: Richard Southorn

Image: 2579 Date: 10/23/2018 Time: 1:41 PM Direction: South Description: Non-contact stormwater downchute. Clear of obstructions. Revetment is in good condition. Functioning as intended.	

Image: 2583 Date: 10/23/2018 Time: 1:42 PM Direction: West Description: Stage 5 final cover is in good condition with no signs of stability. No animal burrows noted. Vegetation is healthy.	

Project: New Castle 2018 Annual Inspection
Photographer: Richard Southorn

Image: 2585 Date: 10/23/2018 Time: 1:42 PM Direction: South Description: Perimeter ditch around Stage 5 is free of obstructions and well maintained.	

Image: 2591 Date: 10/23/2018 Time: 1:43 PM Direction: West Description: Stage 6 final cover is in good condition with no signs of stability. No animal burrows noted. Vegetation is healthy.	

Image: 2595 Date: 10/23/2018 Time: 1:44 PM Direction: South Description: Perimeter ditch around Stage 6 is free of obstructions and well maintained.	

Image: 2597 Date: 10/23/2018 Time: 1:45 PM Direction: West Description: Stage 6 final cover is in good condition with no signs of stability. No animal burrows noted. Vegetation is healthy.	

Project: New Castle 2018 Annual Inspection
Photographer: Richard Southorn

Image: 2599 Date: 10/23/2018 Time: 1:46 PM Direction: Northwest Description: Stage 6 final cover is in good condition with no signs of stability. No animal burrows noted. Vegetation is healthy.	

Image: 2601 Date: 10/23/2018 Time: 1:46 PM Direction: West Description: Perimeter ditch around Stage 6 is free of obstructions and well maintained.