



Inspection Report

To: David Burton, Facility Manager (NRG Indian River Generating Station)

From: Richard Southorn, P.E., P.G., CPSWQ

Re: Indian River Landfill – Annual CCR Unit Inspection Report No. 2

Inspection Date: December 5, 2016

Memo Date: January 18, 2017

INTRODUCTION

Title 40 Code of Federal Regulations (CFR) Part 257 addresses, in part, the management of Coal Combustion Residuals (CCR 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 Indian River Generating Station (owned by Indian River Power, LLC, a subsidiary of NRG Energy, Inc. [NRG]), this inspection requirement applies to the existing Indian River Landfill (IRLF) consisting of a closed Phase I and active Phase II. The closed Phase I is exempt from the regulations but since Phase II piggybacks onto Phase I, it was necessary to include Phase I within the annual inspection since it impacts the structural performance of Phase II.

In support of this obligation, Mr. Richard Southorn (a qualified professional engineer with CB&I Environmental & Infrastructure, Inc. [CB&I]) conducted an on-site inspection of the Indian River Landfill on December 5, 2016. The findings from this second annual inspection are summarized in the remaining sections of this correspondence.

As required, this report will be placed in the Indian River 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 first annual inspection report into the facility's operating record was accomplished on January 18, 2016, meeting the January 18, 2016 deadline per §257.84(b)(3)(i). The following inspection report has been placed into the facility's operating record on January 18, 2017 per §257.84(b)(4).

BACKGROUND

The IRLF is an industrial waste landfill used solely for the disposal of CCR wastes or other industrial wastes generated at the station and is operated/maintained in accordance with the State of Delaware Department of Natural Resources and Environmental Control (DNREC) Solid Waste Permit No. 12/01. The IRLF disposal areas are located approximately one half of a mile south of the Generating Station.

The landfill consists of two major phases, Phase I and Phase II. Phase I is unlined and has a 46 acre footprint. Phase I began accepting waste in 1980 and cap construction was approved and certified closed by DNREC on October 20th, 2014. Phase II has a composite liner, and is 28 acres in size. The Phase II expansion is comprised of two landfill cells (Cell 1 and 2) located

west of Phase I and a piggyback (filling over Phase I) expansion on the western slopes of Phase I. The piggyback expansion of Phase II is separated from Phase I by a composite liner system.

The Phase II expansion began accepting waste on September 17, 2010 within Cell 1. Cell 2 received operational authorization in 2015. Both cells are currently open and actively receiving CCR material. The facility is permitted to sell the CCR for beneficial reuse projects and will continue to seek opportunities to do so.

With respect to the IRLF, CB&I'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 CB&I's preparation of this annual inspection report, and per §257.84(b)(2) (i-iv), the following aspects of the CCR unit have been documented:

- *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

The operating records review of the facility's operating record and verification was performed during the site inspection. Files reviewed during the on-site inspection included but were not limited to: 2011 Phase II Landfill Expansion Application, NRG Permit SW-12/01, 2015 Annual Landfill Operations Report, Weekly Inspection Report, Leachate Collection System Daily Inspection Report, Phase I Cap Inspection Forms, Stormwater Conveyance and Discharge System Forms, and Daily/After Storm Event Erosion Control/Emissions Inspection Form. During the site inspection, Mr. Southorn interviewed Charlie Griggs (Landfill Manager) to verify the information contained within the operating record.

Environmental Control System Overview

- a. **Bottom Liner System** - The Phase II has a composite liner system that consists of a geosynthetic clay liner (GCL) and geomembrane liner system. The composite liner system extends along the piggyback portion between Phase I and Phase II thereby creating a separate layer.

- b. Leachate Collection System - Phase II has a 12-inch drainage system with a series of collection pipes that drain to two sumps located on the north perimeter of Cell 2 and the south perimeter of Cell 1. The leachate is then pumped via a below grade leachate forcemain to the existing above grade leachate storage tanks located west of the landfill. From the tanks, leachate is trucked to the Indian River Generating Station for reuse in the bottom ash system.
- c. Stormwater Management - Non-contact stormwater is drained around the landfill in accordance with the current NPDES permit to stormwater detention basins/ponds located north and south of the landfill. Stormwater run-off from within the active area is collected and managed within the leachate collection system.
- d. Final Cover System - Phase I has received a final cover system and is closed, no final cover system has been installed on Phase II – Cell 1 or Cell 2 which are still active units.

Summary of Landfill Construction

As of the date of this inspection, Phase I has been capped and closed. Cells 1 and 2 are currently open and actively receiving CCR material.

Review of Prior Inspections

- a. Weekly inspections: A review of previous weekly inspections dating back to October 2015 was conducted to understand any deficiencies and remedial actions. Some minor corrective actions were noted for cover and erosion repairs. All deficiencies were found to be remedied in a timely manner.
- b. Annual inspections: A review of the previous annual inspection 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.

Summary of CCR Volumes

Based on the CCR haul quantities provided by Indian River, approximately 784,850 tons of CCR have been disposed within Phase II as of December 5, 2016. Volumes for Phase I were not provided since the Phase I is a closed unit and therefore exempt from the regulations.

SITE INSPECTION

The site inspection was performed on December 5th, 2016 by Mr. Southorn. Mr. Southorn focused on standard geotechnical signs of distress or malfunction such as slumping at the toe of slope, tensile cracking, abnormal or excessive erosion on the side slopes or stormwater management facilities, slope bulging, groundwater/surface water seepage or ponding, etc. These visual 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. Closed portions of Phase I and stabilized intermediate cover areas of Phase II exhibited well established vegetative cover. A small area of the cover showed evidence of regrading, seeding, and stabilization. Upon discussion with the Landfill Manager, it was determined that this area was a corrective action area to address an erosion gully that formed in 2016. The repairs appeared to be appropriate. Please see Photograph 8 in Attachment 2 and the attached figure in Attachment 1 for the corresponding location.

Review of Environmental Control Systems

With no evidence to the contrary, the environmental control systems at IRLF are 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. It is noted that a significant storm at the facility shortly before the inspection produced elevated leachate levels in Cell II of Phase II. The leachate could be seen to be safely and appropriately contained as it was being drawn down. A high-level alarm indicated the liquid level on the collection system control panel, as intended. This observation confirms the effectiveness of environmental controls.

CONCLUSIONS

Based on a review of the facility's operating record, site interviews and a site inspection, the following conclusions were developed:

Changes in Geometry

As of the date of this inspection, Cell 1 and Cell 2 of Phase II are open and receiving CCR material. Active filling operations in Cell 2 in the approximate location shown in the attached figure at a peak elevation generally equal the surrounding perimeter road elevation.

CCR Volume

Based on the CCR haul quantities provided by Indian River, approximately 784,850 tons of CCR have been disposed within Phase II as of December 5, 2016. Volumes for Phase I were not provided since Phase I is a closed unit and therefore exempt from the regulations.

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 either Phase I or II.

Changes that May Affect the Stability or Operation of the CCR Unit

There have been no changes to the Indian River Landfill area that poses a threat or concern to the stability of the land form.

RECOMMENDATIONS

Based on the on-site inspection performed on December 5, 2016, CB&I recommends the following actions:

1. Continue operation and maintenance within the active landfilling area as currently performed.
2. Maintain 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 2016 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 IRLF does not exhibit any appearances of actual/potential structural weakness that would be disruptive to the normal operations of the IRLF. The unit is being operated and maintained consistent with recognized and generally accepted good engineering standards and practices.

Certified by: _____



Date: _____

1/18/17



Richard Southorn, P.E., P.G., CPSWQ
Professional Engineer Registration No. PE 20894
CB&I Environmental & Infrastructure, Inc.

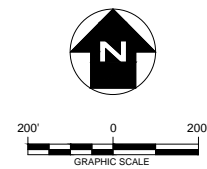
ATTACHMENTS

1. Site Map
2. Inspection Photo Log

REFERENCES

1. Landfill Periodic Inspection Report 2016, January 2016
2. 2016 Annual Landfill Operations Report NRG Energy Indian River Generating Station
3. 40 Code of Federal Regulations Part 257.

Attachment 1
Site Map



LEGEND

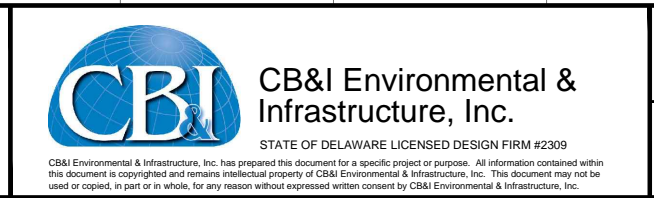
- VEGETATION
- EXISTING FENCE
- 100 YEAR FLOODPLAIN
- WETLAND LIMIT
- EXISTING FORCEMAIN
- BUILDINGS
- PHOTO DIRECTION

NOTES

1. FOR CLARITY, NOT ALL SITE FEATURES MAY BE SHOWN.
2. CURRENT TOPOGRAPHY MAY DIFFER FROM THAT SHOWN.
3. THE NEED FOR FLEXIBILITY TO ACCOMMODATE ADJUSTMENTS AND MODIFICATIONS IS ANTICIPATED CONSIDERING THE SIZE, COMPLEXITY, AND LIFE OF THE PROJECT.
4. EXISTING TOPOGRAPHY OF THE SURFACE WATER SEDIMENT CONTROL BASIN IS FROM FILE "09-034 topo.dwg," PREPARED BY SOULE AND ASSOCIATES, P.C., DATED MARCH 2009. ALL OTHER EXISTING TOPOGRAPHY PROVIDED BY WENCK ASSOCIATES, INC., 1800 PIONEER CREEK CENTER, MAPLE PLAIN MN. 55359. DATE OF AERIAL PHOTOGRAPHY: JANUARY 9, 2003.

T:\AutoCAD\Projects\Indian River\Design\Figures\2016 Annual Inspection Figure.dwg

REV. NO.	DATE	DESCRIPTION



**NRG INDIAN RIVER LANDFILL
SUSSEX COUNTY, DE**


EXISTING SITE TOPOGRAPHY


PROJECT NO.: 1009684058	DATE: FEBRUARY 2016
DESIGNED BY: KJG	DRAWING NUMBER:
DRAWN BY: NV	D3
CHECKED BY: JPV	
APPROVED BY: DAM	SHEET 3 OF 16

Attachment 2


Photo Log



<p>Photograph No. 1</p> <p>Date: Dec. 5, 2016</p> <p>Direction: Southeast</p>	 <p>A photograph showing a brick building labeled 'Leachate Control Building' next to two large, tan, cylindrical storage vaults. The vaults have metal ladders and railings. The scene is outdoors with trees in the background.</p>
<p>Leachate Control Building and leachate storage vaults in secondary containment. Secondary containment was dry with no evidence of staining.</p>	

<p>Photograph No. 2</p> <p>Date: Dec. 5, 2016</p> <p>Direction: Northeast</p>	 <p>A wide-angle photograph of a landfill site. In the center, there is a large pile of lime. A blue truck and a yellow compactor are visible on the ground. The background shows a large, grassy hill under a clear sky.</p>
<p>Description: Active Phase II Cell II area. Lime pile in center of photograph. Active area is well maintained with no ponding areas and no dust being generated.</p>	




<p>Photograph No. 3</p> <p>Date: Dec. 5, 2016</p> <p>Direction: East</p>	
<p>Description: Phase II Cell 1/Cell 2 boundary looking toward Phase II separation berm. No erosion or dust observed.</p>	

<p>Photograph No. 4</p> <p>Date: Dec. 5, 2016</p> <p>Direction: North</p>	
<p>Description: Cell II Phase II active area. Lime pile in center of photograph. Well maintained and graded.</p>	




<p>Photograph No. 5</p> <p>Date: November 17, 2016</p> <p>Direction: North</p>	
<p>Description: Sump area of Cell II Phase II. Leachate collection riser building in the background.</p>	

<p>Photograph No. 6</p> <p>Date: Dec. 5, 2016</p> <p>Direction: Northwest</p>	
<p>Description: Sump area of Cell II Phase II. Leachate from significant recent rain is present, but has been effectively contained.</p>	



<p>Photograph No. 7</p> <p>Date: Dec. 5, 2016</p> <p>Direction: South</p>	
<p>Description: Armored perimeter stormwater ditch of Cell I of Phase II.</p>	


<p>Photograph No. 8</p> <p>Date: Dec. 5, 2016</p> <p>Direction: southeast</p>	
<p>Description: Cover repair area on Cell 1. Cover material was regraded, seeded, and covered with erosion control blanket.</p>	




<p>Photograph No. 9</p> <p>Date: Dec. 5, 2016</p> <p>Direction: Northeast</p>	 <p>A photograph of a small, rectangular building constructed from grey concrete blocks. The building has a white roof and a green double door. A sign on the side of the building reads "Cell 1 Leachate Pump House". In the foreground, there is a concrete structure that appears to be a stormwater culvert, partially obscured by tall grass. The background shows a grassy hillside under an overcast sky.</p>
<p>Description: Cell 1 Leachate pumphouse and stormwater culvert</p>	

<p>Photograph No. 10</p> <p>Date: Dec. 5, 2016</p> <p>Direction: North</p>	 <p>A photograph of a grey metal control panel for a leachate pump. The panel features several red and green buttons, a digital display, and a red emergency stop button. A tall, thin pole with a red light on top is visible in the background. The panel is situated outdoors in a grassy area.</p>
<p>Description: Cell 1 leachate control panel</p>	




<p>Photograph No. 11</p> <p>Date: November 17, 2016</p> <p>Direction: east</p>	
<p>Description: Inside Cell 1 Leachate Pump House. Cleanout riser (bottom pipe), leachate pump risers, and T connection to forcemain shown.</p>	

<p>Photograph No. 12</p> <p>Date: November 17, 2016</p> <p>Direction: East</p>	
<p>Description: Leachate liquid level indicator and controls of Cell II Phase II leachate pumphouse. Red Light is indicating high leachate level due to recent rain.</p>	




<p>Photograph No. 13</p> <p>Date: Dec. 5, 2016</p> <p>Direction: Southwest</p>	
<p>Description: Operations in Stage 2. No erosion gullies observed.</p>	

<p>Photograph No. 14</p> <p>Date: Dec 5, 2016</p> <p>Direction: East</p>	
<p>Description: Leachate liquid level indicator and controls of Cell II Phase II leachate pumphouse. Red Light is indicating high leachate level due to recent rain.</p>	



<p>Photograph No. 15</p> <p>Date: Dec 5, 2016</p> <p>Direction: Southeast</p>	
<p>Stormwater Letdown on north side of Phase I cover.</p>	

<p>Photograph No. 16</p> <p>Date: Dec 5, 2016</p> <p>Direction: West</p>	
<p>Description: Perimeter stormwater channel with temporary storage trailer shown.</p>	



<p>Photograph No. 17</p> <p>Date: Dec 5, 2016</p> <p>Direction: Northeast</p>	
<p>Description: East forebay of surface water sediment control basin</p>	

<p>Photograph No. 18</p> <p>Date: Dec 5, 2016</p> <p>Direction: Northwest</p>	
<p>Description: Non-contact stormwater outfall into perimeter non-contact water perimeter channel.</p>	



<p>Photograph No. 19</p> <p>Date: Dec 5, 2016</p> <p>Direction: Southwest</p>	
<p>Description: Final cover benching/stormwater terraces of Phase I. Terrace berms are clear of obstructions and functioning as intended. Vegetative cover is dense and healthy.</p>	

<p>Photograph No. 20</p> <p>Date: Dec 5, 2016</p> <p>Direction: North</p>	
<p>Description: Standing on top of Phase II Cell 1 plateau looking north into Cell 2 active area.</p>	



<p>Photograph No. 21</p> <p>Date: Dec 5, 2016</p> <p>Direction: West</p>	A wide-angle photograph showing a grassy plateau. The foreground is dominated by tall, dry, golden-brown grass. In the middle ground, a paved road curves to the right, bordered by a line of trees. The background shows a flat horizon under a heavy, grey, overcast sky.
<p>Description: Looking west from atop the Phase II Plateau.</p>	

<p>Photograph No. 22</p> <p>Date: Dec 5, 2016</p> <p>Direction: North</p>	A photograph of a grassy plateau looking north. A dirt path leads from the foreground towards the middle ground. In the distance, a paved road and a line of trees are visible. The sky is overcast and grey.
<p>Description: Looking north on Phase I/Phase II border on plateau.</p>	



<p>Photograph No. 23</p> <p>Date: Dec 5, 2016</p> <p>Direction: Northeast</p>	A wide-angle photograph showing a vast, flat landscape covered in a mix of green and yellowish-brown grasses. The horizon is low, with a line of trees in the distance under a heavy, overcast sky.
<p>Description: Looking northeast, typical final cover of Phase I with thick vegetation.</p>	

<p>Photograph No. 24</p> <p>Date: Dec 5, 2016</p> <p>Direction: Southwest</p>	A photograph of a stormwater ditch. The ditch is filled with tall, dry, brown grasses. To the right, there is a bank of grey gravel. In the background, there are trees and a slight rise in the land.
<p>Description: Phase I perimeter stormwater ditch.</p>	



<p>Photograph No. 25</p> <p>Date: Dec 5, 2016</p> <p>Direction: Southwest</p>	 A photograph showing a wide, grassy slope or terrace bench. The grass is a mix of green and brown, indicating some dryness. In the background, there is a line of trees with bare branches, suggesting a winter or late autumn setting. The sky is overcast and grey.
<p>Description: Phase I terrace bench. Well maintained and functioning as intended.</p>	