Gainesville Regional Utilities
Deerhaven Generating Station

Coal Combustion Residual Units
Annual Inspection Report

(December 16, 2016 – December 12, 2017)

Prepared by:

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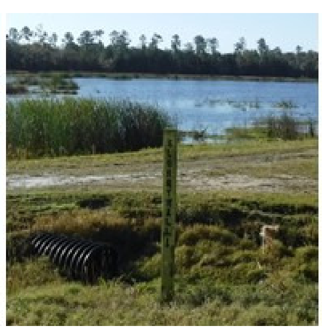


Table of Contents

List of Figures

List of Tables

List of Appendices

1 Introduction

The Deerhaven Generating Station (site) has two coal combustion residuals (CCR) units: a surface impoundment system and a landfill. The surface impoundment system is comprised of two ash ponds (i.e., Ash Cell #1, Ash Cell #2) located within the same slurry wall containment system. These ponds receive cooling tower blowdown and bottom ash sluice water from the site's coal-fired combustion unit (i.e., Unit #2) through a piping network which allows discharge to either pond. Cooling tower blowdown represents the largest discharge stream routed to these ponds and sluiced ash constitutes a relatively small portion of the discharges received by these impoundments. As the water moves through the ash ponds, bottom ash settles and the decant water gravity drains to adjacent pump back ponds (i.e., Pump Back Cell #1, Pump Back Cell #2) through subsurface culverts, which run beneath the embankment separating each ash pond from its adjacent pump back pond. The culvert inlets are enclosed within stoplog structures (located inside the ash ponds near the embankment separating each ash pond from the adjacent pump back pond) to minimize ash entering the culverts. The adjacent pump back ponds are exclusively used to store decant water prior to treatment and re-use in plant operations. The slurry wall containment system is located beneath the peripheral embankment which encompasses the surface impoundment system, the pump back ponds, and two front-end treatment (FET) lime sludge ponds. The slurry wall is keyed into an existing, underlying clay layer. Figure 1 presents a layout view of the surface impoundment system and the two adjacent pump back ponds at the site. The locations of several piezometers used to qualitatively monitor for seepage through the exterior embankments are also shown.

Figure 1. Layout of the CCR Surface Impoundment System and Adjacent Pump Back Ponds (IWCS 2017a)

The CCR landfill primarily accepts flue gas desulfurization byproduct from the Unit #2 scrubbing process. The landfill also accepts bottom ash that is periodically (i.e., approximately every 5 years) excavated from the surface impoundment system. Occasionally, fly ash is also deposited at the landfill when it is not hauled offsite for beneficial use. The landfill is comprised of four cells (i.e., Cells 1-4), sequentially arranged from west to east. The bottom of each landfill cell is graded to drain contact water (i.e., water that contacts CCR) that collects at the cell bottom. Perforated PVC pipes were installed at the base of the cells. Specifically, these pipes are located in the middle of each cell and between each cell intercept and gravity-drain the contact water to a drainage ditch that runs along the northern toe of the landfill (i.e., the Northern Drainage Ditch). Similar to the surface impoundment system, a slurry wall containment system, which is keyed into an existing underlying clay layer, encompasses the landfill and Northern Drainage Ditch. A series of stormwater ditches located outside the slurry wall route stormwater to either a wetland area located just west of the landfill or to a stormwater pond located to the southeast of the landfill.

Currently, Cell 1 and Cell 2 of the CCR landfill are actively receiving material. Figure 2 presents an aerial layout of the CCR landfill at the site, facing east.

Figure 2. Aerial Image of CCR Landfill Facing East (IWCS 2017b)

Title 40 Code of Federal Regulations (CFR) 257.83(b) and 257.84(b) requires that CCR units be annually inspected by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of each CCR unit is consistent with recognized and generally accepted good engineering standards. 40 CFR 257.53 defines a qualified professional engineer as “an individual who is licensed by a state as a Professional Engineer to practice one or more disciplines of engineering and who is qualified by education, technical knowledge and experience to make the specific technical certifications required under this subpart. Professional engineers making these certifications must be currently licensed in the state where the CCR unit(s) is located". This report was prepared by Mr. Justin Smith (FL PE License No. 80463); Mr. Smith is a licensed professional engineer in the State of Florida.

2 CCR Surface Impoundment System

2.1 Review of Relevant Information

The following documents have been reviewed by IWCS to understand the design and operation of the CCR surface impoundment system located at the site while preparing previous annual inspection reports:

- Construction drawings for the surface impoundment system certified as conforming to construction records (B&M 1981)
- Bid documents for the site including construction specifications for the surface impoundment system (B&M 1980)
- A Site Certification Application for Unit 2 (RUB 1977)
- A State of Florida Department of Environmental Regulation Electric Power Plant Site Certification Review FDER (1978)
- A slope stability and liquefaction potential analysis conducted for the surface impoundment system (UES 2015)
- A topographic survey of the surface impoundment system (DSI 2015)
- CCR Surface Impoundment System Hazard Potential Classification (UES 2016a)
- CCR Abutment and Base Surface Impoundment System Evaluation (UES 2016b)

No modification has been made to the design and operational procedures of the surface impoundment system or the landfill since the last inspection. The following additional documents have been developed and reviewed since the previous annual inspection:

- CCR Surface Impoundment System and Landfill Groundwater Monitoring Systems Design and Construction (UES 2017)
- Groundwater Sampling and Analysis Program for the Coal Combustion Residuals Units (IWCS 2017c)
- Completed weekly (7-day) inspection worksheets – 52 Total
- Completed monthly (30-day) inspection worksheets – 12 Total

2.1.1 Review of Surface Impoundment System and Landfill Groundwater Monitoring Systems Design and Construction

Universal Engineering Sciences (UES 2017) designed groundwater monitoring well networks for each of the CCR units. The locations, spacing and well depths were selected based on the hydrogeologic and physical characteristics of site, as well as on a review of historic groundwater flow data (based on potentiometric contour maps developed from an existing wellfield). UES completed the installation and development of the groundwater monitoring wells around each of the CCR units in March 2017.

2.1.2 Review of Groundwater Sampling and Analysis Program for the Coal Combustion Residuals Units

IWCS (2017c) developed a groundwater monitoring plan providing details on the methodology to be used for sampling and analyzing groundwater data collected from the monitoring well networks of each CCR unit.

2.1.3 Review of Weekly and Monthly Inspection Worksheets

40 CFR 257.83(a)(1)(i) and (iii) respectively establish maximum time intervals for weekly (i.e., 7 days) and monthly (i.e., 30 days) inspections of the surface impoundment system. There were 11 and 4 instances where this maximum time interval was exceeded for weekly and monthly inspections, respectively.

Weekly and monthly inspection worksheets for the CCR surface impoundment system have been completed and placed in the operating record since 19 October 2015. IWCS reviewed the worksheets for all the weekly and monthly inspections conducted since the previous annual inspection. Documentation reporting that the deficiencies identified during the previous annual inspection have been addressed is available on GRU's publicly-accessible internet site (IWCS 2017d).

The following unusual conditions were noted in weekly and monthly inspection worksheets covering the current annual inspection period:

- <u>Animal Burrows on Side Slopes</u> – an animal burrow was observed on the outer side slope of Ash Cell #2 on 4 January 2017, and an additional burrow was found on the outer side slope of Ash Cell #1 on 30 January 2017. It appears that both burrows were inspected and filled in late February/early March 2017.
- <u>Elevated Ash Cell Water Levels</u> – both the ash cells experienced elevated water levels for two periods during the timespan covered by this report. It should be noted that the top of the peripheral berm surrounding each of the ash cells is at an elevation of 195 feet, referenced to the National Geodetic Vertical Datum of 1929 (NGVD29). The ash cells are operated with a normal maximum operating level of 193 feet (NGVD29) to provide 2 feet of freeboard in case of heavy rain/storm events.

  The first period of elevated water levels occurred due heavy rains experienced in June; the water level of both ponds was observed to exceed the 193-foot (NGVD29) normal maximum operating level on 13 June 2017. The elevated water levels continued to be above the normal maximum operating level until 26 June 2017 for Ash Cell #1 and 10 July 2017 for Ash Cell #2.

  The second period of elevated water levels was observed following hurricane Irma; both ash cells were observed above the normal maximum operating level starting 19 September 2017. Ash Cell #1 returned to normal levels within a week and Ash Cell #2 returned to normal levels following the 9 October 2017 weekly inspection.

  Operators closely monitored pond levels and adjusted process water and stormwater pumping to the ponds to reduce the ash pond levels as quickly as possible during these time periods.

During each monthly inspection, depth-to-liquid readings in the piezometers located in the embankments of Ash Cell #1 and Ash Cell #2 were measured. The water level measured in these piezometers are used to qualitatively assess potential embankment seepage areas; Piezometer P-2, P-3 and P-4 are used to monitor each outside embankment for Ash Cell #1 and P-1 is used to monitor the outside embankment of Ash Cell #2. The liquid elevation in the piezometers was compared to the liquid elevation in each adjacent ash pond. Figure 3 and 4 present a comparison of the measured liquid levels for Ash Cell #1 and corresponding piezometers and Ash Cell #2 and corresponding piezometer, respectively. IWCS measurements on the day of the inspection were consistent with those measured by GRU during the most recent monthly inspection.

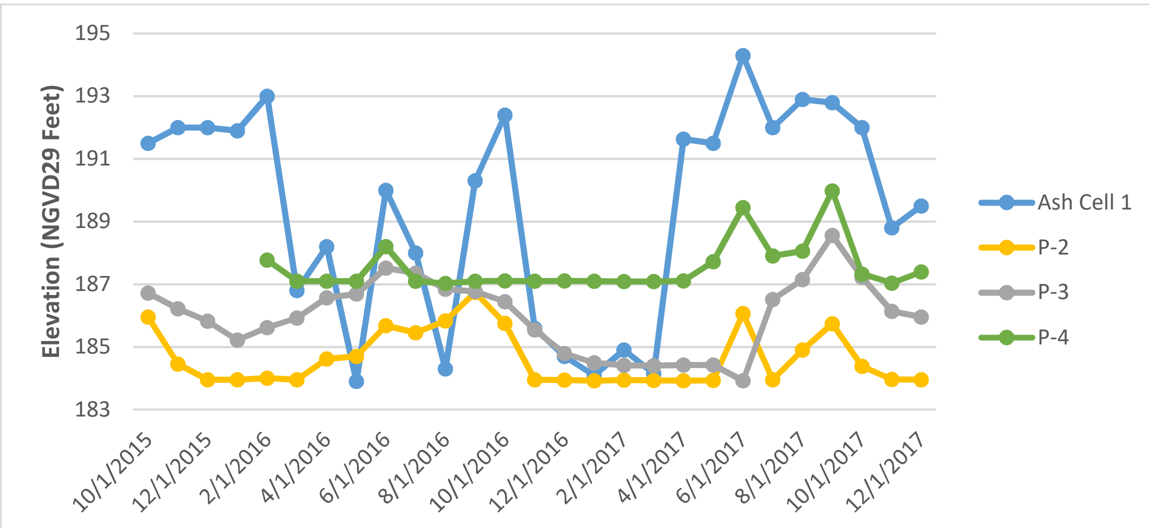

Figure 3. Liquid Elevations for Ash Cell #1 and Piezometers

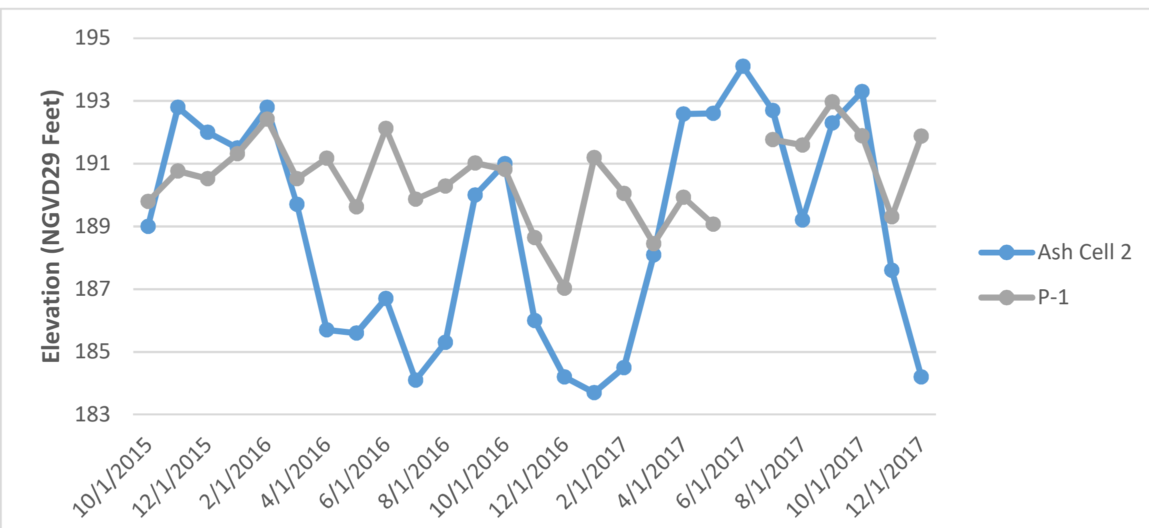

Figure 4. Liquid Elevations for Ash Cell #2 and Piezometer

2.2 Field Inspection

IWCS inspected the CCR surface impoundment system on 12 December 2017. The following section describes observations made during the inspection.

2.2.1 Signs of Distress or Malfunction of CCR Unit or Appurtenant Structures

Moderate interior slope erosion was observed in the western and northern corner of Ash Cell #1 and in the northern corner of Ash Cell #2. Based on discussion with operations personnel, these corners are used as discharge points for vacuum trucks used to clean out bottom ash that has accumulated at low points in plant process equipment. Figures 5, 6, and 7 respectively present the erosion observed in the western corner of Ash Cell #1, the northern corner of Ash Cell #1, and the northern corner of Ash Cell #2.

Figure 5. Erosion on the Western Inside Corner of Ash Cell #1

Figure 6. Erosion on the Northern Inside Corner of Ash Cell #1

Figure 7. Erosion on the Northern Inside Corner of Ash Cell #2

IWCS observed an absence of riprap or other slope armor in these areas – continued erosion in these areas will compromise the structural integrity of the adjacent road and peripheral berm.

2.2.2 Hydraulic Structures

Due to the pond water levels, IWCS was not able to inspect the subsurface culverts which connect each ash cell to its adjacent pump back pond. IWCS recommends that GRU conduct a dry/semi-dry inspection of the culverts to assess their structural integrity as soon as possible.

2.2.3 Geometrical Changes of CCR Unit

IWCS conducted a topographic survey of select features of the surface impoundment system on 13 December 2017. A comparison of the topographic conditions noted during the annual inspection to those observed in the survey conducted by DSI (2015) does not suggest any significant deviations in geometry from those observed during the previous annual inspection. Appendix A includes a comparison between the elevations of the features during this inspection to those presented by DSI (2015). Please note that the survey equipment used by IWCS has a manufacturer-listed maximum accuracy of 4 inches. The surveyed elevations should be considered as rough approximations as the survey was not performed by a licensed surveyor.

2.2.4 Instrumentation Locations and Maximum Readings

Outside of a groundwater monitoring system (separately discussed in detail in annual groundwater monitoring and corrective action reports), the piezometers located adjacent to each of the two ash ponds are the only instruments used to monitor the surface impoundment system. Table 1 presents the location of the piezometers, along with their maximum recorded readings over the last annual inspection period. Please note that the easting and northing coordinates are referenced to US State Plane 1983 Florida North 0903. The maximum reading liquid elevations are referenced to NGVD29. As a point of comparison, the elevation of the top of the peripheral berm surrounding each of the ash cells is at an elevation of 195 feet NGVD29.

Table 1. Location, Type and Maximum Recorded Readings of Existing Instrumentation

Piezometer	Easting	Northing	Max Elevation (NGVD29)
P-1	2636972.5	284823.8	193.0
P-2	2636725.5	284571.1	186.1
P-3	2636691.7	284443.8	188.6
P-4	2636873.5	284259.3	190.0

2.2.5 Elevation of CCR and Impounded Water

Table 2 presents a comparison of the water levels observed on the day of inspection with the maximum and minimum levels recorded by GRU staff during weekly and monthly inspections; the water levels in the ponds are tracked with a staff gauge painted on one of the concrete walls of the stoplog structure in each ash pond. It should be noted that all liquid depths in each pond were calculated assuming the bottom of the ash ponds is located at 179 feet NGVD29, as indicated in the B&M (1981) drawing set. The surface of the settled bottom ash is not evenly distributed – the elevations presented in Table 2 correspond to the water elevation of the ponds.

Table 2. Maximum, Minimum and Present Depth and Elevation of CCR and Water

Location	Media	Parameter	Unit	12/13/17	Minimum	Maximum
Ash Cell #1	Water	Elevation	feet (NGVD29)	189.4	183.2	194.3
		Depth	feet	10.4	4.2	15.3
Ash Cell #2	Water	Elevation	feet (NGVD29)	184.3	183.2	194.3
		Depth	feet	5.3	4.2	15.3

2.2.6 Storage Capacity and Volume of CCR and Impounded Water

The CCR surface in the ash ponds was mostly inundated at the time of this inspection (as shown in the Figure 1 aerial image); the current CCR storage capacity of the surface impoundment systems could not be estimated. However, based on construction records, it is estimated that the CCR surface impoundment system has a total volumetric capacity of 17.3 million gallons (or approximately 85,400 cubic yards) not including the capacity associated with the 2 feet of freeboard.

Based on the present (i.e., 13 December 2017) water elevations in each of the ash ponds, the total in-place volume of water and CCR in the ash ponds is roughly estimated as 8.60 million gallons (or approximately 42,600 cubic yards).

2.2.7 Structural Weaknesses and Adverse Conditions

IWCS walked the external side slopes of the surface impoundment system and the pump back ponds to identify any potential indicators of structural weakness or any other adverse condition including signs of erosion; bulging; depressions; cracks; animal burrows; boils; or excessive, turbid, or sediment-laden seepage.

A single animal forage hole was found on the external slopes of the surface impoundment system and two forage holes were found on the outer slopes of the pump back ponds. Images of these forage holes are presented in Figure 8. As shown in the images, these holes were approximately 16-24 inches deep.

Figure 8. Forage Holes and Depths Observed on External Slopes of the Surface Impoundment System and Pump Back Ponds

2.2.8 Other Changes Affecting Stability or Operation

Several splash blocks are located on the internal slopes of the ash ponds. These splash blocks are used for energy dissipation of discharged plant process waters. Excessive erosion was observed along the inside edge of the southern-most splash block in Ash Cell #1 (see Figure 9). Figure 9 also presents an image of the below-grade condition around the pipe. As shown in the picture, it appears that water has washed out a significant portion of the base grade material which supports the splash block – except for the back side, the entire pipe is visible in the picture.

Figure 9. Above- and Below-Grade Conditions of the Southern-Most Splash Block in Ash Cell #2

3 CCR Landfill

3.1 Review of Relevant Information

40 CFR 257.84(a)(1)(i) establishes a maximum time interval of 7 days for weekly inspections of the CCR landfill. There were 7 instances where this maximum time interval was exceeded.

A total of 51 weekly CCR landfill inspection worksheets were reviewed; these worksheets covered the time period from 13 December 2016 through 12 December 2017. The worksheets allow the inspector to categorize observations as *Acceptable*, *Area of Concern*, or *Needs Attention*. *Area of Concern* is defined in the worksheet as "may develop into a *Needs Attention* area if not addressed. Monitor situation and reevaluate during next inspection. Address as necessary." It should be noted that an *Area of Concern* is not indicative of a problem, but is used to proactively identify and monitor circumstances that have an elevated chance of developing into a problem. *Needs Attention* is defined in the worksheet as "currently or imminently presents a human health, operation or environmental hazard/problem. Address as soon as possible."

Twenty-one (21) *Needs Attention* observations were reported in the weekly inspection worksheets reviewed for this report. Many of these issues appear to be directly related to the heavy rains which occurred throughout June and July, and those which occurred due to hurricane Irma in mid-September.

Based on supervisor notes included in the inspection worksheets, it appears that these issues were addressed as soon as possible and were generally resolved the same day these were observed.

The *Needs Attention* observations corresponded to the following 10 categories:

1) **Access road/ramp obstruction/damage (3 instances)** – A tree fell during a storm event and blocked a peripheral access road. In addition, the main access road was temporarily closed to replace a damaged stormwater culvert (as noted in the previous annual inspection) and an internal access ramp was severely eroded due to a heavy rain event. All these issues were resolved within a week of identification.
2) **High Grass on External Landfill Slopes (1 instance)** – landfill operators noted that grass was higher than 6 inches on 28 August 2017. The grass was mowed the same week.
3) **Internal Erosion of CCR Near Northeast Corner of Cell 2 (1 instance)** – heavy erosion in this area was identified and repaired on 18 October 2017.
4) **Loose Piles of CCR (6 instances)** – loose piles of CCR accumulated on the landfill surface were observed – these piles have the potential to contribute to dust emissions. It appears these piles were spread out and compacted immediately following observation.
5) **Dust from Loose Piles (1 instance)** – one instance of dust from loose CCR was observed and immediately addressed with water spraying on 18 October 2017.
6) **Water Level Above Underdrain Outlets (5 instances)** – four underdrain pipes collect and transport CCR contact water to the Northern Drainage Ditch. Following heavy storm events, the water level in the ditch rose above the level of the underdrain outlets. The Northern Drainage Ditch was pumped down as soon as feasible following these observations.
7) **Sediment Accumulation in Northern Drainage Ditch (1 instance)** – landfill operators noted sediment had accumulated in portions of the Northern Drainage Ditch on 28 August 2017. This sediment appears to have been removed the same week it was identified.
8) **Vegetation Build-Up in Stormwater Culvert Inlets/Outlets (1 instance)** – vegetation was observed to be partially obstructing stormwater culverts on 10 October 2017. The vegetation was removed from these culverts the same week it was identified.
9) **Damaged Stormwater Culvert (1 instance)** – a corrugated metal stormwater culvert located in the southeast corner of the landfill was observed to be severely corroded. This culvert transports stormwater collected in a shallow north-south oriented ditch located along the eastern side of the landfill to a stormwater pond located to the southeast of the landfill. As documented in IWCS (2017d), the replacement of this culvert was completed on 1 February 2017.
10) **Stormwater Pond Backed up into Stormwater Ditches (1 instance)** – stormwater from the stormwater pond located to the southeast of the landfill was observed backed up into the stormwater ditches surrounding the landfill on 12 September 2017 – the day following hurricane Irma. Water levels appear to have receded the same week – this observation was not noted in the subsequent weekly inspection worksheet.

Fifty-three (53) “Areas of Concern” were noted. Grass and other vegetation height (14 instances), elevated water levels in the Northern Drainage Ditch (6 instances), minor internal erosion (6 instances), and animal burrows (4 instances) together account for the majority of these observations.

3.2 Field Inspection

IWCS inspected the CCR landfill on 13 December 2017. The following section describes observations made during the inspection event.

3.2.1 Signs of Distress or Malfunction

Sediment accumulation was observed near the middle of the Northern Drainage Ditch – this ditch accepts CCR contact water from the landfill which gravity drains to a pump station located at its eastern extent. Accumulated sediment is partially obstructing gravity drainage. Figure 10 depicts the condition in this area.

Figure 10. Sediment Accumulation in the Northern Drainage Ditch

IWCS observed two deficiencies related to improper grading of the top deck of Cell 1 and Cell 2:

- **Moderate erosion of the southern side of an internal access ramp leading from Cell 3 to Cell 2** – rather than draining from south to north, as detailed in the landfill filling plan, it appears that the southeast corner of Cell 2 is draining to the southeast. As a result, contact water has eroded a portion of the interior slope of the peripheral containment berm located in this area. Figure 11 shows the erosion in this area.
- **Concentration and slight erosion of inside toe of west-most peripheral containment berm** – the western portion of Cell 1 currently appears to be graded so that contact water primarily flows west, concentrates along the inside edge of the western peripheral containment berm, and then continues flowing north. This flow path is starting to cause erosion along the toe of the peripheral berm and is contributing to contact water accumulation and ponding in the northwest corner of the landfill; this

area has historically been challenging to operate equipment in due to soft spots. The grading of this area is presented in Figure 12 – please note that this picture was taken facing south.

Figure 11. Erosion near Cell 2/Cell 3 Access Ramp

Figure 12. Grading Along Western Side of Cell 1

Ponded CCR contact water was observed in the southern end of the Cell 4 basin area. As described in the Run-on and Run-off Control System Plan (IWCS 2016b), this Cell 4 basin area is necessary for contact water storage in the event of a 24-hour, 25-year storm; ponding in this area represents a decrease in contingency storage capacity. Figure 13 presents an aerial image of the Cell 4 basin area. Please note that the picture is oriented according to the cardinal directions (i.e., up is north).

Figure 13. Aerial Image of Ponding in the Southern End of the Cell 4 Basin Area

3.2.2 Geometrical Changes of CCR Landfill

In accordance with the landfill filling plan, the interior of Cell 1 and Cell 2 and the peripheral berm on the external side slopes of Cell 1 and Cell 2 are progressively raised by approximately 4 feet for each lift of deposited CCR. No changes in the geometry of the landfill indicative of structural instability or weakness were noted.

3.2.3 Volume of CCR

IWCS conducted a topographic survey of the landfill on 13 December 2017 and used AutoCAD Civil 3D 2013 cut-and-fill procedures to estimate the in-place CCR volume; the landfill bottom elevation was assumed to be 184 feet NGVD29 (as approximately shown in B&M 1981). Approximately 374,000 cubic yards of CCR and other materials (i.e., cover soil, FET lime sludge) have been deposited in the landfill to date. The topographic survey and the estimated in-place volume should be considered as a rough approximation as the survey was not performed by a licensed surveyor.

3.2.4 Structural Weaknesses and Adverse Conditions

IWCS performed a visual inspection of all exterior slopes of the CCR landfill for any appearance of actual or potential structural weakness including signs of erosion; bulging; depressions; cracks; animal burrows; boils; or excessive, turbid, or sediment-laden seepage. Two relatively deep (i.e., greater than 2 feet deep) animal burrows/forage holes were identified on the southern slope of the landfill. Pictures of these burrows are presented in Figure 14.

Figure 14. Animal Burrows/Forage Holes and Hole Depths Observed on the Southern Slope of the CCR Landfill

3.2.5 Other Changes Affecting Stability or Operation

No other changes or circumstances, which may impact the stability or operation of the landfill, were noted during the inspection.

4 Summary of Deficient Conditions and Recommendations

Table 3 presents a summary of the locations of each deficient condition observed during the annual inspection.

Table 3. Location Summary of Deficient Conditions Observed During the Annual Inspection

CCR Unit	Location	Condition
Surface Impoundment System	Western and Northern Internal Corners of Ash Cell #1, Northern Internal Corner of Ash Cell #2	Erosion and Unarmored Slopes
	External Slope of Ash Cell #2, Southwest External Slope of Pump Back #1, Near Light Post on Southeast External Slope Between Pump Back Ponds	Animal Forage Holes (x3)
	Southern-most Splash Block in Ash Cell #2	Erosion and Undercutting of Base Layer
Landfill	Middle Section of Northern Drainage Ditch	Sediment Accumulation
	South Side of Cell 2/Cell 3 Access Ramp	Erosion
	Western Side of Cell 1	Improper Surface Drainage Path and Erosion
	Southern Section of Cell 4 Basin	Ponding
	Southern Exterior Side Slope	Animal Burrows/Forage Holes (x2)

All deficiencies identified for the CCR units were brought to the attention of GRU on 14 and 19 December 2017.

IWCS makes the following recommendations to address the deficiencies identified during this annual inspection:

1. For the internal ash pond corners where erosion was observed, IWCS recommends that GRU remove the existing unsuitable material from these corners and restore them to their original condition (i.e., compact existing underlying soils, place and/or compact well-graded aggregate or an alternative suitable base course, and then place riprap over the surface to provide internal slope erosion protection against future pond wave action and other erosive forces). In addition, IWCS recommends that future vacuum truck loads be discharged at an alternative (to be determined) location within the CCR landfill to prevent further erosion of internal surface impoundment system slopes.
2. The culvert penetrating the southern-most splash block in Ash Cell #2 should be inspected for leaks and defects and repaired or replaced as necessary. A suitable foundational support material/base layer should be installed below the splash block as soon as possible.
3. Sediments accumulated in the Northern Drainage Ditch should be excavated and relocated to the interior of the landfill.
4. GRU should ensure that the top deck is sloped at approximately 2% to the south in accordance with the design presented in the CCR Landfill Filling Plan – this will mitigate both the Cell 2/Cell 3 access ramp erosion issue and the issue associated with improper grading of the western portion of Cell 1. IWCS recommends that GRU place additional CCR in these areas as necessary to achieve the design grades.
5. Additional material should be placed in the southern portion of the Cell 4 basin area to provide gravity drainage of CCR contact water to the 36-inch culvert located at the basin's northern extent. Once this material is placed, the change in capacity of this area should be evaluated to estimate what changes (if any) are necessary to maintain sufficient capacity to manage the total volume of precipitation associated with a 24-hour, 25-year storm. Prior to the placement of CCR in this area, GRU should provide inlet protection (e.g., hay bales) of the 36-inch culvert to prevent sediment intrusion.
6. GRU should relocate resident animal(s) and backfill all animal forage holes/burrows in accordance with federal, state, and local law.
7. As part of the minimum list of annual inspection items, §257.83(b)(1)(iii) requires "a visual inspection of any hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit for structural integrity and continued safe and reliable operation". IWCS was unable to inspection the subsurface culverts which connect each ash cell with its adjacent pump back pond. Considering the age (i.e., approximately 37 years old) and importance of these culverts to the safe and reliable operation of the plant, IWCS strongly recommends that these culverts be inspected as soon as possible.

Per §257.83(b)(5) and §257.84(b)(5), GRU is required to address these identified deficiencies as soon as feasible and document the corrective measures taken.

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6 Professional Engineer Certification

This plan was prepared under the supervision, direction and control of the undersigned, registered professional engineer (PE). The undersigned PE is familiar with the requirements of 40 CFR 257.83(b) and 84(b). The undersigned PE certifies that this CCR unit annual inspection report meets the requirements of 40 CFR 257.83(b) and 84(b).

Name of Professional Engineer: Justin L. Smith

Company: Innovative Waste Consulting Services, LLC

PE Registration State: Florida

PE License No.: 80463

This item has been electronically signed and sealed by Justin L. Smith, PE, on 16 January 2017 using a digital signature. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Justin L. Smith

Digitally signed by Justin L. Smith
DN: cn=Justin L. Smith, o=Innovative Waste Consulting Services, LLC, ou, email=jsmith@iwcs.biz, c=US
Date: 2018.01.16 13:59:41 -05'00'

Appendix A

Comparison Table of Surface Impoundment System Elevations from DSI (2015) and Elevations Observed by IWCS 12 December 2017

Surface Impoundment System Feature	12 December 2017 Elevation (feet NGVD29)	DSI (2015) Survey Elevation (feet NGVD29)
Top of Embankment - Ash Cell 1	195.3 - 195.6	194.9 - 195.9
Top of Embankment - Ash Cell 2	195.5 - 196.8	194.7 - 195.6
Top of Embankment - Pump Back Cell 1	188.3 - 188.6	187.6 - 188.7
Top of Embankment - Pump Back Cell 2	189.0 - 189.5	188.1 - 188.8
Stoplog Structure - Ash Cell 1	195.8	195.3
Stoplog Structure - Ash Cell 2	196.0	195.2
Stoplog Bridge Abutment - Ash Cell 1	195.4	194.8 - 194.9
Stoplog Bridge Abutment - Ash Cell 2	195.7	194.8 - 194.9
Top of North Splash Block Ash Cell 1	195.3	194.7
Top of South Splash Block Ash Cell 1	195.6	194.7
Top of North Splash Block Ash Cell 2	195.4	194.7
Top of South Splash Block Ash Cell 2	195.4	194.6 - 194.7
Electrical Equipment Building Retaining Walls	188.2 - 188.5	188.1 - 188.4
Ash Pipe Drain Pit	180.8 - 180.9	179.6 - 180.3
Ash Cell 1 Outer Embankment Toe	181.1 - 183.0	182.6 - 182.7
Ash Cell 2 Outer Embankment Toe	182.0 - 182.8	182.1 - 182.7