



# **Gainesville Regional Utilities Deerhaven Generating Station**



## **Coal Combustion Residual Units Annual Inspection Report (January 9, 2016 – December 15, 2016)**

**Prepared by:**

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**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 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 which separates each ash pond from the adjacent pump back pond) which prevent the settled bottom ash from 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 in 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 depicted.



**Figure 1. Layout of the CCR Surface Impoundment System and Adjacent Pump Back Ponds (IWCS 2016a)**

As of the time of the 2016 annual inspection of the CCR units, Unit #2 was in outage; CCR is currently not being placed at the landfill. However, during operational periods, the CCR landfill primarily accepts flue gas desulfurization byproduct from the Unit #2 scrubbing process. The landfill also accepts bottom ash which 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 gravity drain contact water (i.e., water that comes in contact with CCR) that collects at each cell's base. Perforated PVC pipes 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. Similar to the surface impoundment system, a slurry wall containment system which is keyed into an existing underlying clay layer encompasses the landfill as well as the northern ditch. Additional ditches located to the west, east and south of the landfill are exclusively used for routing stormwater run-off to the stormwater pond located to the southeast of the landfill. 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 2016b)**

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 were reviewed by IWCS to understand the design and operation of the CCR surface impoundment system located at the site while preparing the annual inspection report in 2015:

- 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)

No modification was 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 Hazard Potential Classification (UES 2016a)
- CCR Abutment and Base Surface Impoundment System Evaluation (UES 2016b)
- Completed weekly (7-day) inspection worksheets – 49 Total
- Completed monthly (30-day) inspection worksheets – 12 Total

#### 2.1.1 Review of Design and Construction Information

In accordance with §257.73(c), GRU has compiled a “history of construction” (IWCS 2016c) that provides a detailed review of the construction of the surface impoundment system; this document is available on GRU’s publicly-accessible internet site. The assessment presented in this report is based on the extent of documents that were available at the time of the 2015 annual inspection. Based on these historical documents, the design and construction of the surface impoundment system appears to have been consistent with recognized and generally accepted good engineering standards.

#### 2.1.2 Review of Hazard Potential Classification

IWCS reviewed a report which classifies the hazard potential of the surface impoundment system, as required per §257.73(a)(2). Based on the volume of impounded water and the location of critical infrastructure in the vicinity of the surface impoundment system, the surface impoundment system was classified as low hazard potential (UES 2016a).

### 2.1.3 *Review of Abutment and Base Surface Impoundment System Evaluation*

IWCS reviewed a report summarizing the results of a structural stability assessment required by §257.73(d) (UES 2016b). During the assessment, UES completed a geotechnical investigation of the embankments, evaluated exterior and interior slope protection and surface conditions, and concluded that the structural stability of the surface impoundment system appeared to be satisfactory.

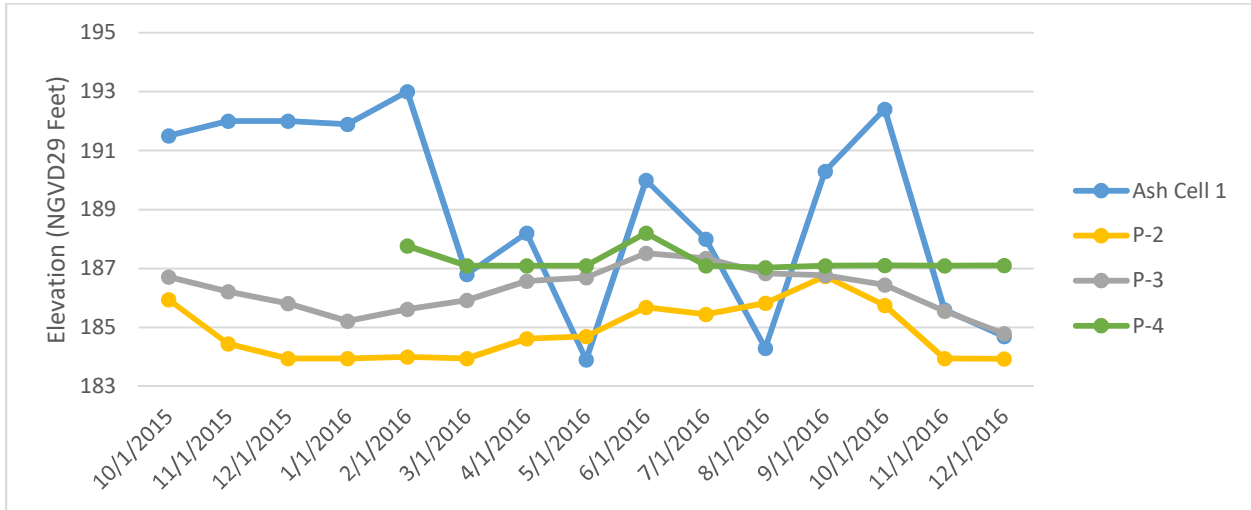
### 2.1.4 *Review of Weekly and Monthly Inspection Worksheets*

Weekly 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 2016d).

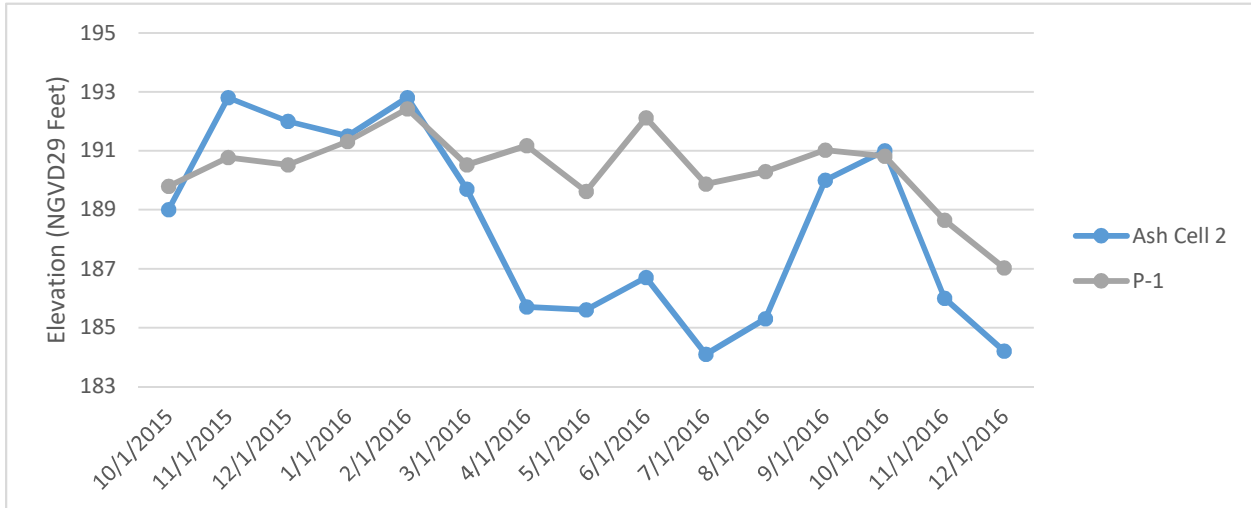
The following unusual condition was noted in weekly inspection worksheets covering the current annual inspection period:

- Side Slope Vegetation Height > 6 Inches - the grass height on the outer slopes of both Ash Cell #1 and Ash Cell #2 was observed to be greater than the 6-inch requirement (§257.73(a)(4)) on 16 June 2016. A work order was generated the same day (i.e., #65164) to mow these areas.

During each monthly inspection, an inspector documents the depth to the liquid level in piezometers located in the embankments of Ash Cell #1 and Ash Cell 2. The water level measured in these piezometers are qualitatively used to identify 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 level 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 15 December 2016. The following section describes observations made during the inspection event:



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

Light pavement damage was apparent on the inside of the road that runs over the outer embankment near the northern corner Ash Cell #1, as shown in Figure 5. No additional visible signs of distress or malfunction of the CCR unit or appurtenant structures were observed at the time of the inspection.



**Figure 5. Pavement Damage on the Inside Edge of the Road on the Northern Corner of Ash Cell #1**

### 2.2.2 Hydraulic Structures

On 4 August 2016, a team of engineers from IWCS and UES met with GRU to inspect the culverts connecting the ash ponds to their respective pump back ponds using an underwater camera (SPX Pearpoint P340 Flexiprobe digital push camera with a 200-foot reel). A 4-inch PVC pipe was used to locate the inlet of the submerged culverts and to guide the camera into the culverts. Specifically, this inspection was undertaken per the requirement of §257.73 (d)(vi). The following observations were made during the inspection:

- The two culvert inlets were located (from the stoplog structure end) and the camera was inserted and advanced until refusal at approximately 60-65 feet within each culvert.
- The turbidity level prevented clear imagery of the inside of the culvert pipes; however, very high-contrast surfaces/discoloration directly in front of the camera were somewhat distinguishable.
- No contrasting surfaces/discoloration was observed in the culvert pipe. The color uniformity of the image throughout the entire culvert length probed does not suggest corrosion of the pipe bottom. Based on the original Burns and McDonnell (1981) as-built drawings, these culverts are glass fiber reinforced pipes and are not expected to corrode.
- Refusal was encountered at the approximate midpoint (i.e., 60-65 feet into the exploration) of each culvert. Based on the Burns and McDonnell (1981) as-built drawings, these culverts are approximately 125-feet long. The similarity in the resistance location in the two culverts suggests a design feature (e.g., pipe joint) may be a potential cause for this resistance. However, there may be other causes of this resistance (e.g., sediment accumulation, pipe deformation).

Based on the turbidity levels encountered during the inspection, it does not appear that the culverts' condition (as required per §257.73 (d)(vi)) can be accurately assessed with an underwater inspection. Therefore, a dry/semi-dry inspection of the culverts is recommended.

To conduct this type of inspection, GRU would need to almost completely drain both the pump back ponds to remove the water from the entire length of the culverts. The pump back ponds are the reservoirs for the plant's cooling tower makeup water; unless both Unit #1 and Unit #2 were in outage, draining these ponds would be pose an operational constraint for plant operation. GRU does not feel that a dry/semi-dry inspection of the culverts is feasible at this time without impacting plant operation.

### 2.2.3 Geometrical Changes of CCR Unit

IWCS conducted a topographic survey of select features of the surface impoundment system on 14 and 15 December 2016. 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

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 from January 2016 to December 2016. 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 the National Geodetic Vertical Datum of 1929 (NGVD29).

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

Piezometer	Easting	Northing	Max Elevation (NGVD29)
P-1	2636972.5	284823.8	192.4
P-2	2636725.5	284571.1	186.7
P-3	2636691.7	284443.8	187.5
P-4	2636873.5	284259.3	188.2

### 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 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	12/15/16	Minimum	Maximum
Ash Cell #1	Water	Elevation	feet (NGVD29)	184.6	183.9	193.0
		Depth	feet	5.6	4.9	14.0
Ash Cell #2	Water	Elevation	feet (NGVD29)	183.9	183.9	192.9
		Depth	feet	4.9	4.9	13.9

### 2.2.6 Storage Capacity and Volume of CCR and Impounded Water

A large fraction of the CCR surface in the ash ponds was inundated at the time of this inspection (as depicted for Ash Cell #2 in Figure 6); the current storage capacity of the CCR unit was not 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) with 2 feet of freeboard.



**Figure 6. Variable CCR Surface in Ash Cell #2**

A large portion of the CCR surface was inundated; a volumetric estimate of impounded CCR was not conducted. However, based on the present water elevations in each of the ash ponds, the total in-place volume of water and CCR in the ash ponds on 15 December 2016 was roughly estimated as 5.31 million gallons (or approximately 26,300 cubic yards).

### 2.2.7 Structural Weaknesses and Adverse Conditions

IWCS walked the external side slopes of the surface impoundment system 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 burrow was identified near the top of the external slope of Ash Cell #2 near its eastern extent. This burrow was brought to the attention of GRU personnel on 15 December 2016.

### 2.2.8 Other Changes Affecting Stability or Operation

No other changes or conditions were noted during the inspection which may have impacted the stability or operation of the surface impoundment system.

## 3 CCR Landfill

### 3.1 Review of Relevant Information

A total of 49 weekly inspection worksheets completed for the CCR landfill were reviewed; these worksheets covered the time period from 11 January 2016 through 12 December 2016. The worksheets allow the inspector to categorize observations as “Acceptable”, “Area of Concern”, or “Needs Attention”. “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.” “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 potential of developing into a problem.

Thirteen (13) “Needs Attention” observations were made in the timeframe of the weekly inspection worksheets reviewed for this report. Based on supervisor notes included in the inspection worksheets, it appears that these issues were addressed as soon as possible and were frequently resolved the same day they were observed.

The “Needs Attention” observations can be organized into 8 categories:

- 1) **Culvert Outlet Erosion (4 instances)** – a dual culvert discharges CCR contact water to the ditch located inside the slurry wall in the northern portion of the CCR landfill. Heavy rain events caused moderate to heavy erosion of the soil in the immediate vicinity of the culvert outlets.
- 2) **Water Level Above Underdrain Outlets (3 instances)** – four underdrain pipes collect and transport CCR contact water to the ditch located inside the slurry wall in the northern portion of the CCR landfill. Following heavy storm events, the water level in the ditch rose above the level of the underdrain outlets.
- 3) **High Grass (1 instance)** – landfill operators noted that grass was higher than 6 inches on 24 May 2016.
- 4) **Dust from Access Roads (1 instance)** – dust emissions were immediately addressed when observed on 26 July 2016.
- 5) **Loose Piles of CCR (1 instance)** – loose piles of CCR accumulated on the landfill surface during the period from 26 July to 10 August 2016 due to breakdown of the dozer used to spread and compact this material.
- 6) **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. Currently, the catchment basin for this ditch is relatively small. Plans to repair this culvert pipe were made prior to the annual inspection and are scheduled for January 2017.

- 7) **Sediment Accumulation in Northern Drainage Ditch (1 instance)** – landfill operators noted sediment had accumulated in a portion of the ditch located inside the slurry wall in the northern portion of the CCR landfill on 13 September 2016.
- 8) **Underdrain Obstruction (1 instance)** – vegetation/sediment was found partially obstructing underdrain outlets on 4 October 2016.

Twenty (20) “Areas of Concern” were noted. The majority (i.e., eleven) of these had to do with high grass on the external landfill side slopes and slight ponding in the southern stormwater ditch. All “Areas of Concern” appear to have been monitored and were typically addressed as soon as possible.

### 3.2 *Field Inspection*

IWCS inspected the CCR landfill on 15 December 2016. The following section describes observations made during the inspection event.

#### 3.2.1 *Signs of Distress or Malfunction*

With the exception of the damaged stormwater culvert described previously, no signs of distress or malfunction were noted at the CCR landfill during the inspection.

#### 3.2.2 *Geometrical Changes of CCR Landfill*

In accordance with the landfill phasing 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 14 December 2016 and used AutoCAD Civil 3D 2013 cut-and-fill procedures to estimate the volume of in-place CCRs; the landfill bottom elevation was assumed to be 184 feet NGVD29 (as approximately shown in B&M 1981). Approximately 348,000 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. A number of surficial (i.e., less than 8-inches deep) diggings were found on the external side slopes, which appeared to be the result of animals searching for

worms/grubs – see Figure 7 for an example of these diggings. These surficial diggings do not appear to be indicative of structural weakness.



**Figure 7. Surficial (<8 Inches Deep) Animal Digging Found on External Western Side Slope**

Four (4) burrows (i.e., diggings greater than 8-inches deep) were also found. The locations of these burrows were flagged and were brought to the attention of GRU personnel on 16 December 2016. One burrow was located along the northern external slope of the landfill while the other three were located on the southern external slope.

Images of the inlet and outlet location, respectively, of the damaged stormwater culvert discussed in Section 3.1 are presented in Figures 8 and 9.



**Figure 8. Inlet Location of Damaged Stormwater Culvert**



**Figure 9. Outlet Location of Damaged Stormwater Culvert**

*3.2.5 Other Changes Affecting Stability or Operation*

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

**4 Summary of Deficient Conditions**

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	Inside Edge of Pavement On Outer Embankment Near Northern Corner of Ash Cell #1	Damaged Pavement
	Eastern Extent of the Top of the External Slope of Ash Cell #2	Animal Burrow
Landfill	Southern End of N-S Stormwater Drainage Ditch Located East of Cell 4	Damaged Stormwater Culvert
	Northern and Southern Exterior Side Slopes	Animal Burrows

The damaged pavement located on the outer embankment of Ash Cell #1 was discussed with GRU personnel on 15 December 2016.

IWCS flagged all animal burrows and brought them to the attention of GRU personnel on 15 and 16 of December 2016. We recommend that GRU both relocate resident animal(s) and backfill these burrows in accordance with federal, state, and local law.

GRU currently has the materials to conduct the repair of the damaged stormwater culvert; this task is scheduled for January 2017.



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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.



### 5 References

B&M (1980). Deerhaven Generating Station – Unit 2, Bid Documents, Contract 29C – Yard Structures III. Prepared for the City of Gainesville, Florida, by Burns and McDonnell.

B&M (1981). Deerhaven Generating Station - Unit 2 Construction, Contract 29C – Yard Structures III. Drawing set conforming to construction records. Prepared for the City of Gainesville, Florida – Alachua County Regional Utilities Board, by Burns and McDonnell. Revised 1 July 1981.

DSI (2015). Map Showing Topographic Survey of a Part of Sections 26 and 27, Township 8 South, Range 19 East, Alachua County, Florida. Survey conducted by Degrove Surveyors, Inc. on 13 April 2015 and Certified to Gainesville Regional Utilities. Drawing set completed 8 September 2015.

FDER (1978). State of Florida Department of Environmental Regulation Electric Power Plant Site Certification Review. Prepared for the Gainesville-Alachua County Regional Utilities Board, Deerhaven, Unit No. 2, Case No. PA 74-04, by the Power Plant Siting Section, Bureau of Permitting, Division of Environmental Permitting, 17 March 1978.

IWCS (2016a). CCR Surface Impoundment System and Pump Back Ponds. Aerial Imagery. Deerhaven Generating Station, Gainesville, Florida. Photograph taken 16 December 2016.

IWCS (2016b). CCR Landfill. Aerial Imagery. Deerhaven Generating Station, Gainesville, Florida. Photograph taken 16 December 2016.

IWCS (2016c). History of Construction – Coal Combustion Residual Surface Impoundment System. Prepared for Gainesville Regional Utilities, Deerhaven Generating Station by Innovative Waste Consulting Services, June 2016.

IWCS (2016d). Corrective Measures to Address Deficiencies Noted in the Coal Combustion Residual Units Annual Inspection Report. Prepared for Gainesville Regional Utilities, Deerhaven Generating Station by Innovative Waste Consulting Services, 14 April 2016.

RUB (1977). Site Certification Application, Deerhaven Station Unit 2, Vol. 1. Amended Application For Certification For The Deerhaven Unit 2 Steam Electric Generating Facility. Submitted to the Florida Department of Environmental Regulation by Gainesville/Alachua County Regional Electric, Water & Sewer Utilities Board, 9 December 1977.

UES (2015). Geotechnical Exploration Services – Slope Stability and Liquefaction Potential Analysis, Process Pond Impoundment Dikes, Deerhaven Generating Station (DGS), 10001 NW 13<sup>th</sup> Street, Gainesville, Alachua County, Florida. Project No. 0230.1500077. Report No. 1251804. Prepared for Innovative Waste Consulting Services, LLC by Universal Engineering Sciences, 20 November 2015.

UES (2016a). Geotechnical Consulting Services – Coal Combustion Residuals (CCR) Surface Impoundment System Hazard Potential Classification, Deerhaven Generating Station (DGS), 10001 NW 13<sup>th</sup> Street, Gainesville, Alachua County, Florida. Project No. 0230.1500077. Report No. 1352241. Prepared for Innovative Waste Consulting Services, LLC by Universal Engineering Sciences, 12 October 2016.



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UES (2016b). Geotechnical Consulting Services – Coal Combustion Residuals (CCR) Abutment and Base Surface Impoundment System Evaluation, Deerhaven Generating Station (DGS), 10001 NW 13<sup>th</sup> Street, Gainesville, Alachua County, Florida. Project No. 0230.1500077. Report No. 1352022. Prepared for Innovative Waste Consulting Services, LLC by Universal Engineering Sciences, 12 October 2016.

**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

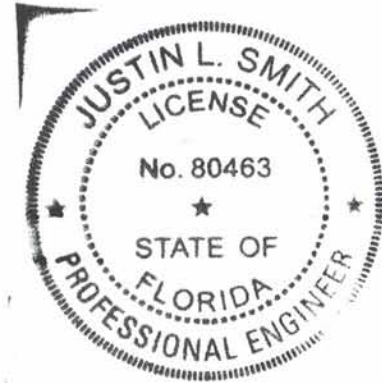
Company: Innovative Waste Consulting  
Services, LLC

Signature: 

Date: January 18, 2017

PE Registration State: Florida

PE License No.: 80463



## Appendix A

### Comparison Table of Surface Impoundment System Elevations from DSI (2015) and Elevations Observed by IWCS 15 December 2016

Surface Impoundment System Feature	14-15 December 2016 Elevation (feet NGVD29)	DSI (2015) Survey Elevation (feet NGVD29)
Top of Embankment - Ash Cell 1	194.7 - 196.1	194.9 - 195.9
Top of Embankment - Ash Cell 2	194.6 - 196.5	194.7 - 195.6
Top of Embankment - Pump Back Cell 1	188.5 - 189.2	187.6 - 188.7
Top of Embankment - Pump Back Cell 2	189.0 - 189.3	188.1 - 188.8
Stoplog Structure - Ash Cell 1	195.7	195.3
Stoplog Structure - Ash Cell 2	195.3	195.2
Stoplog Bridge Abutment - Ash Cell 1	195.2	194.8 - 194.9
Stoplog Bridge Abutment - Ash Cell 2	194.9	194.8 - 194.9
Top of North Splashblock Ash Cell 1	194.7	194.7
Top of South Splashblock Ash Cell 1	194.9	194.7
Top of North Splashblock Ash Cell 2	194.7	194.7
Top of South Splashblock Ash Cell 2	194.9	194.6 - 194.7
Electrical Equipment Building Retaining Walls	188.7 - 188.8	188.1 - 188.4
Ash Pipe Drain Pit	180.6	179.6 - 180.3
Ash Cell 1 Outer Embankment Toe	181.5 - 183.0	182.6 - 182.7
Ash Cell 2 Outer Embankment Toe	182.6 - 183.3	182.1 - 182.7