BIG CAJUN II
COAL COMBUSTION RESIDUAL (CCR)
ANNUAL INSPECTION REPORT

NRG Louisiana Generating, LLC (LaGen)
NRG Energy, Inc.
Baton Rouge, Louisiana

Project Number 1005494026

January 2017

Prepared for:

NRG Louisiana Generating, LLC (LaGen)
NRG Energy, Inc.
New Roads, LA 70760

Prepared by:

CB&I Environmental & Infrastructure, Inc.
4171 Essen Lane
Baton Rouge, LA 70809

Table of Contents

List of Figures

List of Appendices

List of Acronyms

CB&I	CB&I Environmental & Infrastructure
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
LAC	Louisiana Administrative Code
LaGen	Louisiana Generating, LLC,
LPDES	Louisiana Pollution Discharge Elimination System
MSL	Mean Sea Level
Yd^3	Cubic yards

1.0 INTRODUCTION

The Big Cajun II Power Plant (Big Cajun II Plant), operated by Louisiana Generating, LLC (LaGen), a subsidiary of NRG Energy, Inc., is a coal-fired and natural gas fired power plant located in New Roads, Louisiana (**Figure 1**). The Disposal of Coal Combustion Residuals (CCR) from Electric Utilities final rule (the Rule) was issued by the United States Environmental Protection Agency (Title 40 of the Code of Federal Regulations §257 [40CFR Part 257]) and applies to this facility due to the disposal of CCR that is generated from the combustion of coal at the site. 40 CFR Part 257 addresses, in part, the management of CCR in regulated units, including all surface impoundments. Specific to Section §257.83(b) of the CCR Rule, new and existing CCR surface impoundments must be inspected on an annual basis by a qualified professional engineer. This report details the findings for the CCR Annual Inspection Report for the following regulated CCR Units at the Big Cajun II Plant:

- Fly Ash Unit
- Bottom Ash Unit

Mr. Glen R. Landry, P.E., a qualified professional engineer with CB&I Environmental & Infrastructure (CB&I) conducted an on-site inspection of the above impoundments on October 12, 2016. The following report details the summary of findings of the CCR Annual Inspection for the Big Cajun II Plant.

As required, this report will be placed in the Big Cajun II Plant operating record per §257.105(g), notice the State Director per §257.106(g), and posted to a publicly accessible internet site per §257.107(g). This annual inspection report is considered completed when the inspection report has been placed in the facility's operating record. The previous report was placed in the operating record on January 18th, 2016. The deadline for completion of subsequent annual inspections is one year from the date of placement of the previous year's report into the operating record.

1.1 Background and CCR Inspection Requirements

The solid waste facilities at the Big Cajun II Plant are permitted under the Louisiana Solid Waste Regulations (LAC 33:VII), Permit Number P-0108R1 (Facility Identification Number GD-077-0583). The solid waste permitted surface impoundments at the Big Cajun II Plant include:

- Fly Ash Unit
- Bottom Ash Unit
- LPDES Primary and Secondary Treatment Basins
- Rainfall Surge Pond

With respect to the CCR surface impoundments, namely the Fly Ash and Bottom Ash Units, CB&I's evaluation focused on the following site inspection items outlined in §257.83(b)(i-vii):

- A review of available information regarding the status and condition of the CCR unit, including, but not limited to, files in the operating record
- A visual inspection of the CCR unit to identify signs of distress or malfunction
- A visual inspection of any hydraulic structures underlying the base of the CCR unit

CB&I's preparation of the annual inspection report, as per §257.83(b), includes:

- Any changes in geometry of the impounding structure since the previous annual report
- The location and type of existing instrumentation and maximum recorded readings
- The approximate minimum, maximum and present depth and elevation of the impounded water and CCR since the previous annual inspection
- The storage capacity of the impounding structure at the time of the inspection
- The approximate volume of the impounded water and CCR 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 appurtenant structures
- Any other change(s) which may have affected the stability or operation of the impounding structure since the previous annual inspection

2.0 OPERATING RECORDS REVIEW

2.1 Summary of Impoundment Construction

The above five solid waste surface impoundments occupy 298 acres of the 1,939 acres of the Big Cajun II Plant. The surface impoundments are located northwest of the Plant as detailed on **Figure 2**.

The CCR Waste Management Units at the Big Cajun II Plant are the Fly Ash and Bottom Ash Units. These units collect and store the fly ash and bottom ash removed from the Boiler Units' combustion exhausts and the boilers during power generation. Fly ash is transported by truck to the Fly Ash Unit for disposal. The bottom ash from Boiler Unit 1 is transported hydraulically (sluiced) directly to the Bottom Ash Unit. Unit 3 bottom ash is collected at the base of the boiler and transported by truck to the Bottom Ash Unit. The rainwater and wastewater that is collected in the Ash Units is further treated and routed to the Primary and Secondary Treatment Basins prior to discharge to the Mississippi River under the Plant's Louisiana Pollutant Discharge Elimination System (LPDES) water discharge permit (Permit No. LA0054135).

Fly Ash Unit

The Fly Ash Unit was constructed and operational in 1980. The Fly Ash Unit was constructed above natural grade with a base of approximately 30 feet MSL and a designed crest elevation of 40 feet MSL with an approximate capacity of 1,750 acre-feet.

Bottom Ash Unit

The Bottom Ash Unit was constructed and operational in 1980. The Bottom Ash Unit was constructed above natural grade with a base of approximately 30 feet MSL and a designed crest elevation of 48 feet MSL with an approximate capacity of 1,188 acre-feet.

LPDES Primary and Secondary Treatment Basins

The Treatment Basins began operation in 1979. The Primary Treatment Basin has an approximate capacity of 457.2 acre-feet. The Secondary Treatment Basin has an approximate capacity of 127.8 acre-feet. All wastewater from the Plant site is collected and receives treatment in the Treatment Basins prior to discharge under LPDES Permit No. LA0054135.

Rainfall Surge Pond

The Rainfall Surge Pond was constructed in 1979 as an incised impoundment with a bottom elevation of 19 feet MSL (approximately 10 to 12 feet below the original ground surface). The Rainfall Surge Pond has an approximate capacity of 331.3 acre-feet.

2.2 Storm Water Management

The solid waste impoundments at the Big Cajun II Plant were designed and constructed to prevent uncontaminated storm water runoff or backwater from flowing through them. Clay dikes surround the Ash Units and two LPDES Wastewater Basins and effectively segregate on-site and off-site storm water runoff. All surface runoff from the Fly Ash and Bottom Ash Units is collected and transported by gravity flow to the Rainfall Surge Pond. The storm water management system for the Plant was designed without pumps to minimize the operation and maintenance costs as well as to avoid potential drainage problems that could arise from downtime due to equipment failure or maintenance. The Rainfall Surge Pond, as a result, has no dikes because its purpose is to collect surface water runoff from the Plant and storage areas. All water collected in the Rainfall Surge Pond is then transported by a lift station to the two Treatment Basins for treatment.

2.3 Summary of Construction Activities

Prior to the 2016 inspection, the only activity in the units since the 2015 initial inspection has been the placement of fly ash and bottom ash in the units in accordance with normal operating procedures. After the October 12, 2016 inspection, remedial measures have been conducted to address observed areas of localized sloughing, as discussed below.

2.4 Review of Prior Inspections

A summary of inspections prior to the initial inspection in 2015 was compiled and presented in the initial inspection report. In general, the inspections identified areas of potential instability from sloughing and erosion on the interior face of the dikes from wave action. All identified areas of concern were subsequently remediated. Additional inspections have been performed and documented on weekly CCR impoundment inspection logs. A review of the inspection logs and discussion with NRG personnel indicated that two areas of sloughing along the Fly Ash Unit and the Bottom Ash Unit have been identified. Subsequent to the 2016 inspection, NRG indicated that remedial measures for the Bottom Ash Unit were completed in the 4th Quarter of 2016, and that remedial measures for the Fly Ash Unit are being planned for the Spring of 2017.

2.5 Review of Remedial Actions from Prior Inspections

There were no remedial actions recommended during the initial Annual Inspection completed in October 2015.

3.0 ANNUAL SITE INSPECTION

3.1 Inspection Procedure

On October 12th 2016, CB&I engineers, Glen Landry, PE and Christopher Paul, conducted a visual inspection of the CCR units in accordance with the CCR Rule annual inspection requirements. The inspection consisted of walking the crest, exterior side slopes, and toe of the dikes of the Fly Ash Unit and the Bottom Ash Unit; observing and recording the conditions and observing the condition of the interior side slopes. A detailed inspection of the levee between the Fly Ash Unit and the Bottom Ash Unit was not performed due to the levels of ash being approximately at the same levels on both sides of the levee, therefore, not presenting a potential failure condition. A Photo Log of annual inspection observations is presented in **Appendix A**.

3.2 Visual Signs of Distress or Malfunction

Fly Ash Unit

At the time of the inspection, the grass was about 6-inches tall and allowed for adequate inspection. No woody vegetation was observed along the side slopes. Numerous animal burrows were observed along the exterior side slopes of the dike. The burrows were generally 3 to 4–inches in diameter and most did not extend more than six inches in depth; they are not considered to be a source of instability. The burrows are believed to be dug by armadillos that were observed in the area.

The area within the Fly Ash Unit surrounding the discharge pipe to the Bottom Ash Unit showed signs of significant ash buildup (Photo 1). This is the result of backflow from the Bottom Ash Unit during recent high rainfall.

Fly ash that had been placed along the inside of the levee for erosion protection showed areas of erosion of the fly ash (Photo 5 and 7), however, there was no evidence of erosion of the levee material.

Minor surficial desiccation cracking was observed in some areas along the levees, however, these areas are likely to be rehydrated during the next rainy season and are not considered significant. Wet toe seepage areas were not observed during the inspection, though a 50 by 200 foot area of marshy grass was identified, and while the area was not wet at the time of inspection, it is indicative of an area that holds water long enough for such plants to thrive. However, this area is considered to be part of the natural low lying area of the site and not the result of seepage.

The area of sloughing previously identified by NRG was observed along the south levee near the southwest corner of the Fly Ash Unit (**Figure 3**). This area was about 40 feet wide and about 3 feet of displacement (Photo 9). It was observed that this area was accompanied by cracking in the exterior wheel path of the road on the top of the levee (Photo 8). This may be an indication of weakness contributing to the sloughing. Other areas of cracking in the wheel paths were also observed along the south levee (**Figure 3**), however, indications of sloughing were not observed in these areas. Two areas were observed on the north levee and the west levee near the northwest corner of the Fly Ash Unit that present an irregularity in the slope that drops 3 to 4 inches (**Figure 3**). Each area is about 30 to 40 feet long and located 3 to 4 feet below the top of the levee. It could not be determined whether the "drop" is the result of the initial phase of sloughing or wheel ruts from grass mowing activities, however, these areas should be observed for changes.

Repairs of the unstable area referenced in the 2015 inspection report were observed along the south levee and the area appeared stable.

Bottom Ash Unit

At the time of the inspection, the grass was about 6-inches tall and allowed for adequate inspection. No woody vegetation was observed along the side slopes. A few animal burrows were observed along the northern and southern exterior side slopes. The burrows were generally 3 to 4–inches in diameter and generally did not extend more than six inches in depth; they are not considered to be a source of slope instability.

Recent excavation in the Bottom Ash Unit had been performed to provide drainage of surface and/or sluice water.

No desiccation cracks were observed in the Bottom Ash Unit levees.

Wet toe seepage areas were not observed during the inspection.

The second area of sloughing previously identified by NRG was observed along the north levee near the northwest corner of the Bottom Ash Unit (**Figure 3**). The area was about 30 feet wide and about 2 feet of rotational displacement (Photo 12). No other sloughing or cracking was observed. Repairs of the unstable area referenced in the 2015 inspection report were observed along the north levee and the area appeared stable.

3.3 Hydraulic Structures

There are no underlying hydraulic structures for either the Fly Ash or Bottom Ash Units at the Big Cajun II Plant. Water from the Fly Ash and Bottom Ash Units is transported by a 30-inch gravity flow pipe to the Rainfall Surge Pond (**Figure 2**). The Rainfall Surge Pond is the collection point

for all rainfall water and wastewater from the plant island, storage areas, and impoundments. Based on historical photographs and topographic maps, surface water drainage in the area of the impoundments is to the southwest.

The fly ash surface water is directed by an interior drainage swale to a pipe connection into the Bottom Ash Unit (**Figure 2**). The Bottom Ash Unit sluice water and surface water combined with water from the Fly Ash Unit are directed by an interior swale to a weir located at the northeast corner of the Bottom Ash Unit. A 30-inch diameter pipe carries the combined water by gravity flow to the Rainfall Surge Pond. In the event of high water in the Bottom Ash Unit, an over flow weir (Photo 14 and 15) is located between the Bottom Ash Unit and the Primary Treatment Basin. There is a flow control valve between the Bottom Ash Unit and the Rainfall Surge Pond. Water from the Rainfall Surge Pond is then pumped into the Primary Treatment Basin for further treatment. Water flows by gravity from the Primary Treatment Basin to the Secondary Treatment Basin. A pump station moves water from the Secondary Treatment Basin to the Mississippi River discharge point.

During the inspection, all hydraulic structures appeared to be operational.

4.0 CONCLUSIONS

4.1 Impoundment Geometry

This is the second annual inspection. No changes in impoundment geometry were apparent compared to the first annual inspection.

4.2 Instrumentation and Readings

A staff gauge is located in the northeastern corner of the Fly Ash Unit. The gauge is observed weekly as part of the routine inspection. The elevation of the Fly Ash Unit gravity flow outlet pipe generally controls the water level in the impoundment. At no time since the first annual inspection has the Fly Ash Unit surface water level measurement indicated less than 2 feet of available freeboard.

Due to the low elevation of the Bottom Ash Unit exit weir and gravity flow outlet pipe, the majority of the Bottom Ash Unit typically remains dry. At no time since the first annual inspection has the Bottom Ash Unit surface water level measurement indicated less than 2 feet of available freeboard.

4.3 Depth and Elevation of Water and CCR

Observation of the inside of the levee showed the water level to be approximately 7 feet below the crest of the levee. The elevation of the Fly Ash Unit gravity flow outlet pipe generally controls the impoundment water level at approximately 35 feet MSL, or at a depth of about 2 feet. At the time of the annual inspection, the depth of water inside the impoundment was approximately 2 feet as seen in Photo 2 which shows the submerged water discharge structure from the Fly Ash Unit. Approximately one-third of the surface (the southeastern portion) of the Fly Ash Unit is covered with CCR material, which is generally at or below the elevation of the levees. The highest area of stockpiled ash is located near the southeast corner of the Fly Ash Unit. The stockpile is approximately 15 feet in height, but is approximately 200 feet from the levee. The CCR material in the Fly Ash Unit currently reaches a maximum elevation of approximately 45 feet MSL. The depth and elevation of water and CCR material are consistent with the previous annual inspection.

Typically the only portion of the Bottom Ash Unit that holds water is a shallow drainage swale located inside the northern levee. Observation showed the surface water level in the drainage swale was about 18 feet below the crest of the levee. The entire base of the unit is covered with ash. The north half of the unit is covered to a level of about 15 feet below the crest of the levee, while the southern half is filled to about the level of the levee. The southern half also has a large stockpile of ash at the ash disposal location. The stockpile is approximately 15 to 20 feet tall, but is no closer than approximately 50 feet from the levee. The CCR material in the Bottom Ash Unit

currently reaches a maximum elevation of approximately 68 feet MSL, equivalent to a depth of approximately 38 feet. The depth and elevation of water and CCR material are consistent with the previous annual inspection.

4.4 Storage Capacity

As determined using the volumes presented in Section 4.5, below, the Fly Ash Unit was estimated to have a remaining CCR material storage capacity of approximately 2,600,000 cubic yards (yd^3), and a remaining water storage capacity of approximately 1,953,000 yd^3, based on a water surface elevation of 35 feet MSL.

The Bottom Ash Unit was estimated to have a remaining CCR material storage capacity of approximately 1,385,000 yd^3, and a remaining water storage capacity of approximately 717,000 yd^3, based on the current level of fill.

4.5 Current Volumes

The Fly Ash Unit was permitted to hold a total of 3,905,000 yd^3 of CCR material, with a designed capacity to the crest of the levee of 2,823,000 yd3. Using the most recently available topographic survey, the current Fly Ash Unit solids and water volumes were estimated to be approximately 1,305,000 yd^3 and 870,000 yd^3, respectively.

The Bottom Ash Unit was permitted to hold a total of 2,585,000 yd^3 of CCR material, with a designed capacity to the crest of the levee of 1,917,000 yd^3. Using the most recently available topographic survey, the current Bottom Ash Unit solids volume was estimated to be approximately 1,200,000 yd^3. At the time of the inspection, there was a negligible volume of water in the Bottom Ash Unit.

4.6 Appearance of Actual or Potential Structural Weakness of CCR Units

At the time of the inspection, there were no signs of distress or malfunction that would indicate actual or potential structural weakness of the Fly and Bottom Ash Units.

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

There have been no changes to the Fly Ash or Bottom Ash Units that pose a threat or concern to the stability of the impoundments.

5.0 RECOMMENDATIONS

Based on the current inspection, the following recommendations are provided:

1. Ongoing maintenance of berms/dikes as per the CCR Rule weekly/monthly inspection requirements

2. Recording of the depth and elevations of impounded water and CCR material as per §257.83(b)(2)(iii) of the CCR Rule

3. Any berm repairs which are required to be undertaken over the course of 2017 should be Construction Quality Assured (CQA) by a 3rd party contractor to verify works have been undertaken as required

4. CCR material should not be stockpiled near the dikes, to reduce any potential instability for the units

6.0 PROFESSIONAL ENGINEER'S CERTIFICATION

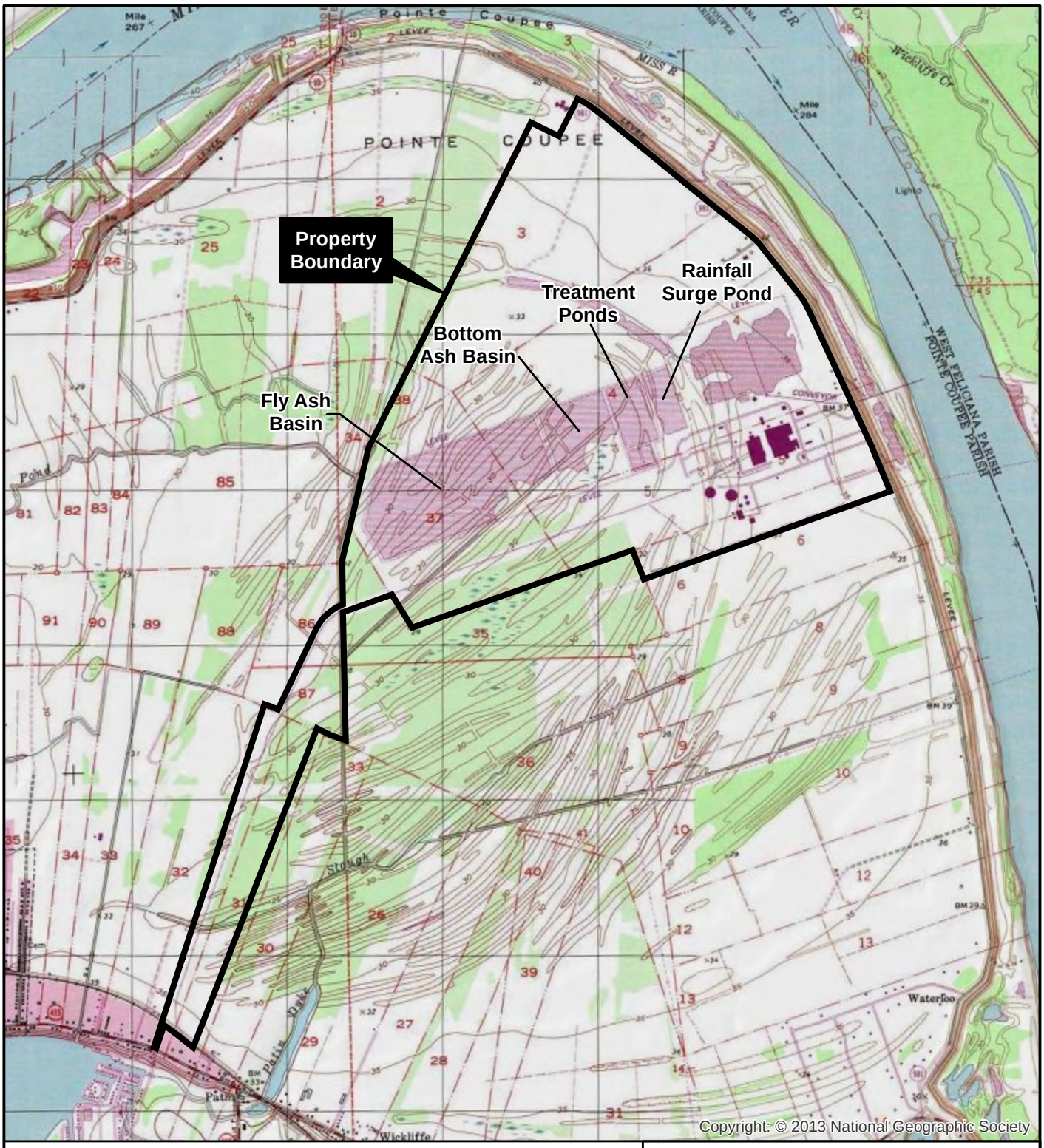
In accordance with §257.83(b) of the CCR Rule, I hereby certify based on a review of available information within the facility's operating records and observation from my personal on-site inspection (including photographs presented in Appendix A), that the Fly Ash and Bottom Ash Units do not exhibit any appearances of actual/ potential structural weakness that would be disruptive to the normal operations of the CCR Units. The Units are being operated and maintained consistent with recognized and generally accepted good engineering standards and practices.

Certified by: Glen R. Landry

Date: 1/4/17

Glen R. Landry, P.E.
Professional Engineer Registration No. 18931
CB&I Environmental & Infrastructure, Inc.

Figures



N

0 1,500 3,000 6,000

Feet

LOUISIANA GENERATING, LLC
BIG CAJUN II POWER PLANT
NEW ROADS, LOUISIANA

2016 ANNUAL CCR INSPECTION

FIGURE NUMBER 1

SITE LOCATION

CB&I Environmental & Infrastructure, Inc.
4171 Essen Lane
Baton Rouge, Louisiana 70809

PRIMARY TREATMENT POND

RAINFALL SURGE POND

MISSISSIPPI RIVER

INDUSTRIAL WASTE CANAL

COAL STORAGE

FLY ASH BASIN

BOTTOM ASH BASIN

STORAGE SILOS

CONVEYOR BELT

ACCESS ROAD

SECONDARY TREATMENT POND

BARGE UNLOADING

BOILER NO. 1

BOILER NO. 3

BOILER NO. 2

Source: Esri, DigitalGlobe, User Community

LEGEND

1 3	INTERIOR DRAINAGE SWALE
2 5 7	30" DIA. PIPE
4	EXIT WEIR
6	BUTTREFLY VALVE
8	JUNCTION BOX
9	DISCHARGE
10	LIFT STATION
11	CHEMICAL STORAGE
12	DISCHARGE TO PRIMARY TREATMENT
13	AERATOR
14	LIFT STATION TO MISSISSIPPI RIVER
15	OVERFLOW WEIR

N

0 400 800 1,600

Feet

LOUISIANA GENERATING, LLC
BIG CAJUN II POWER PLANT
NEW ROADS, LOUISIANA

2016 ANNUAL CCR INSPECTION

FIGURE NUMBER 2

SITE LAYOUT

CB&I Environmental & Infrastructure, Inc.
4171 Essen Lane
Baton Rouge, Louisiana 70809

PRIMARY TREATMENT POND

RAINFALL SURGE POND

Levee Sloughing/Failure

Possible Surface Sloughing

MISSISSIPPI RIVER

INDUSTRIAL WASTE CANAL

COAL STORAGE

FLY ASH BASIN

BOTTOM ASH BASIN

STORAGE SILOS

CONVEYOR BELT

ACCESS ROAD

SECONDARY TREATMENT POND

BARGE UNLOADING

BOILER NO. 1

BOILER NO. 3

BOILER NO. 2

Levee Sloughing/ Failure

Road Rutting

Slope Cracking

Source: Esri, DigitalGlobe, User Community

N

0 400 800 1,600

Feet

LOUISIANA GENERATING, LLC
BIG CAJUN II POWER PLANT
NEW ROADS, LOUISIANA

2016 ANNUAL CCR INSPECTION

FIGURE NUMBER 3

LEVEE OBSERVATIONS

CB&I Environmental & Infrastructure, Inc.
4171 Essen Lane
Baton Rouge, Louisiana 70809

Appendix A
Annual Inspection Photo Log

Photographic Record

Client: NRG
Location: Big Cajun II, Baton Rouge, LA
Project No. 631215151

Photographer: Glen R. Landry
Photograph Date: 10/12/16

Photo No: 1 **Picture Direction**: W

Description: Northeast corner of Fly Ash Unit washout of Bottom Ash Unit into Fly Ash Basin

Photo No: 2 **Picture Direction**: W

Description: Submerged Fly Ash Unit discharge pipe to Bottom Ash Basin

Photo No: 3 **Picture Direction**: W

Description: Northeast corner of Fly Ash Unit along north levee

Photo No: 4 **Picture Direction**: S

Description: Northeast corner of Fly Ash Unit

Client: NRG
Location: Big Cajun II, Baton Rouge, LA
Project No. 631215151

Photographer: Glen R. Landry
Photograph Date: 10/12/16

Photo No: 5 **Picture Direction**: W

Description: Example of erosion protection undercut along north Fly Ash Basin levee.

Photo No: 6 **Picture Direction**: W

Description: NW corner of Fly Ash Basin. Note coloration of rocks indicating the high water mark.

Photo No: 7 **Picture Direction**: E

Description: SW corner of Fly Ash Basin looking along south levee

Photo No: 8 **Picture Direction**: E

Description: Tension cracks in road surface at a slough in SW corner of Fly Ash Basin.

Client: NRG
Location: Big Cajun II, Baton Rouge, LA
Project No. 631215151

Photographer: Glen R. Landry
Photograph Date: 10/12/16

Photo No: 9 **Picture Direction**: N

Description: Slope escarpment below tension cracked section along south levee of FAB

Photo No: 10 **Picture Direction**: NE

Description: Southwest corner of Fly Ash Basin from 30°43’ 19.51”W 91° 23’ 29.22”N

Photo No: 11 **Picture Direction**: SW

Description: Whirlpool at Bottom Ash Basin discharge in NE corner of Bottom Ash Basin

Photo No: 12 **Picture Direction**: S

Description: Slough and bulge of Bottom Ash Berm near northeast corner.

Client: NRG
Location: Big Cajun II, Baton Rouge, LA
Project No. 631215151

Photographer: Glen R. Landry
Photograph Date: 10/12/16

Photo No: 13 **Picture Direction**: W

Description: Slope sloughing with soil rotation along the north Bottom Ash Basin levee.

Photo No: 14 **Picture Direction**: W

Description: Overflow inlet on east side of Bottom Ash Unit

Photo No: 15 **Picture Direction**: E

Description: Overflow outlet on east side of Bottom Ash Unit

Photo No: 16 **Picture Direction**: E

Description: Bottom Ash Unit side slope