CLECO POWER LLC
DOLET HILLS POWER STATION

5-YEAR PERIODIC REVIEW
HAZARD POTENTIAL CLASSIFICATION ASSESSMENT

ASH BASIN NO. 2

OCTOBER 2021

Providence Engineering and Environmental Group LLC
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Providence Project No: 039-115-003

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1.0 INTRODUCTION

Providence was contracted by Cleco Power LLC (Cleco) to conduct the 5-year periodic review of the hazard potential classification assessment of Ash Basin No. 2 at Cleco's Dolet Hills Power Station.

The Coal Combustion Residual (CCR) regulations at 40 CFR 257.73(a)(2) established requirements for owners and operators to conduct a hazard potential classification assessment to assess the potential adverse incremental consequences that would occur if there was a failure of the CCR surface impoundment. Cleco conducted the initial Hazard Potential Classification Assessment and placed it in the facility operating record on October 17, 2016.

This 5-year periodic review for the hazard potential classification assessment pertains to Ash Basin No. 2 utilized for the coal-fired generation unit. The Cleco Dolet Hills Power Station is located approximately 8 miles southeast of Mansfield, DeSoto Parish, LA. A site location map showing the Dolet Hills Power Station is included as **Figure 1**. The Ash Basin No. 2 is shown in **Figure 2**.

2.0 HAZARD POTENTIAL CLASSIFICATION

Per the CCR regulations, a hazard potential classification provides an indication for danger to life, development, or the environment in the event of a release of CCR from a surface impoundment. The CCR rule requires an owner or operator of any existing or new CCR surface impoundment or any lateral expansion of a CCR surface impoundment to determine which of the following hazard potential classifications characterizes their particular CCR unit. These potential classifications include the following:

- High Hazard Potential CCR Surface Impoundment – means a diked surface impoundment where failure or misoperation will probably cause loss of life.
- Significant Hazard Potential CCR Surface Impoundment – means a diked surface impoundment where failure or misoperation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.
- Low Hazard Potential CCR Surface Impoundment – means a diked surface impoundment where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the surface impoundment's owner's property.

In the 2016 Hazard Potential Classification report, Ash Basin No. 2 was analyzed to determine effects of a breach in the current levee system. Two scenarios were used in each model: Maximum and Most Probable Loss. In both scenarios, a shear break to the bottom of the levee was assumed. The Maximum scenario flow rate was calculated using a height of water measured from the bottom of pond to the top of levee. The Most Probable Loss scenario flow rate was calculated using a height of water measured from the bottom of pond to the normal operating elevation.

Ash Basin No. 2 was initially constructed by erecting a levee on the downstream side of an existing natural drainage area. The only levee that exists around Ash Basin No. 2 is on the south and west sides. Ash Basin No. 2 shares a perimeter levee with the Secondary Ash Pond to the south.

The 2016 report results of the levee breach analysis for Ash Basin No. 2 showed that the impact of a breach in the levee system would be routed to the area north of the power station. Minor impacts to power plant property and adjacent woodlands are expected. The analysis showed an increase to headwater at a maximum of 5' for the Most Probable Loss condition, and a maximum of 6' for the Maximum Loss condition. These maximum levels occur in the channel located to the west of Ash Basin No. 2. A breach in the perimeter levee for Ash Basin No. 2 does not affect the plant's railroad north of the station.

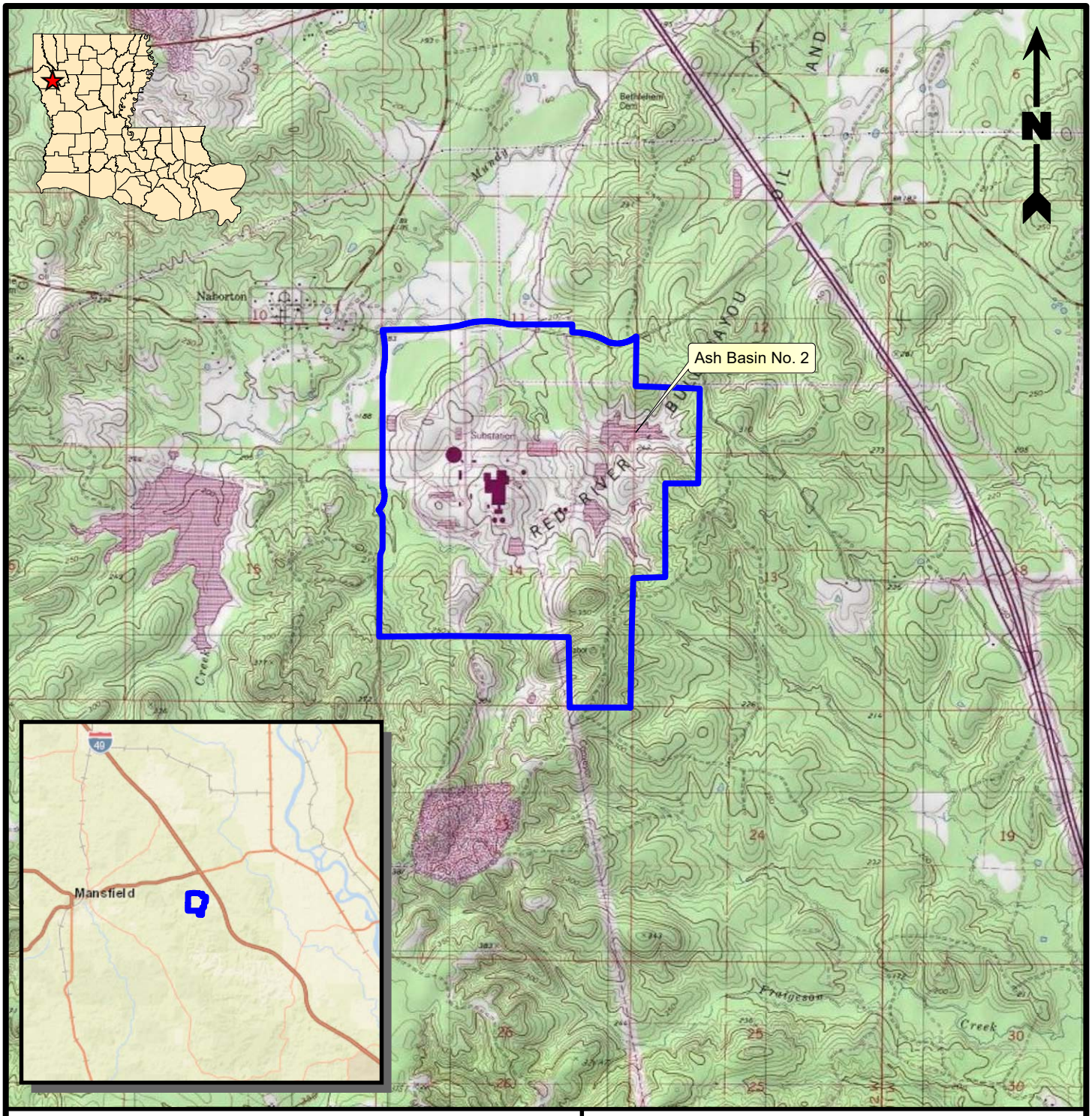
Ash Basin No. 2 is currently operated in the same manner that it was in 2016, when the initial Hazard Potential Classification Assessment was completed. Providence reviewed and updated the costs in the Levee Breach Analysis (**Appendix A**) and has determined that Ash Basin No.2 will remain classified as a low hazard potential CCR surface impoundment.

3.0 CONCLUSIONS

Based on a review of the results of the maximum and most probable loss scenarios, Ash Basin No. 2 at Cleco's Dolet Hills Power Station will remain classified as a low hazard potential CCR surface impoundment. Losses anticipated from a levee breach would principally impact the onsite property and have less of an impact on the offsite wooded area and any streams within this area. **Appendix B** contains a P.E. Certification that attests to the 5-year periodic review of the Hazard Potential Classification Assessment of Ash Basin No. 2.

FIGURE 1

SITE LOCATION MAP



Legend

Facility Boundary

Reference

Base map comprised of U.S.G.S. 7.5 minute topographic maps, "Lena, LA", "Boyce, LA", "Jericho, LA", and "Gardner, LA".

Site Location Map

5-Year Periodic Review
Hazard Potential Classification Assessment - Ash Basin No. 2
Mansfield, DeSoto Parish, Louisiana

Cleco Power LLC
Dolet Hills Power Station

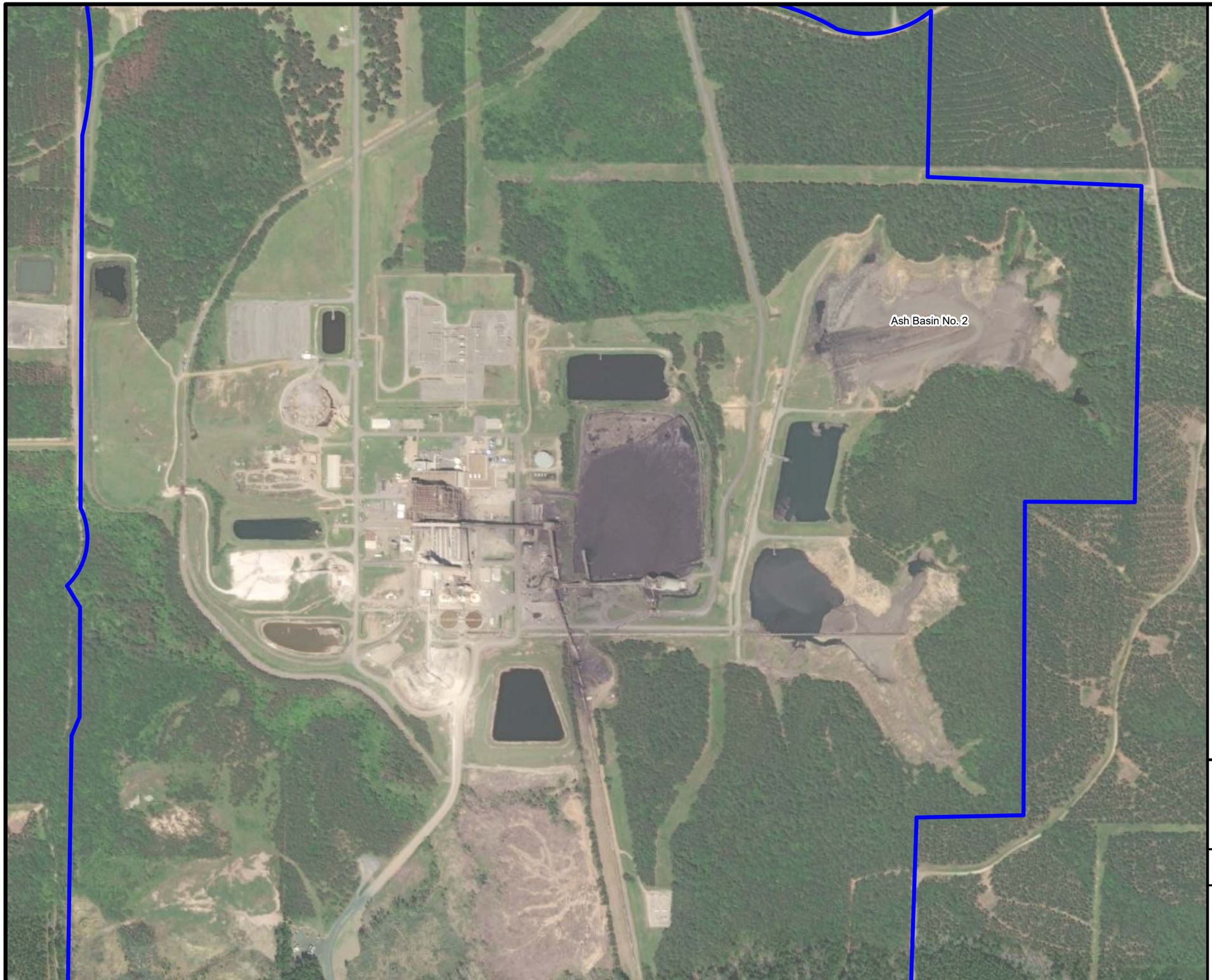
Drawn By	LMH	09/21/21
Checked By	LMH	09/21/21
Approved By	CVH	09/21/21

PROVIDENCE

Project Number	002-293
Drawing Number	002-293-A011
1	Figure

FIGURE 2

SITE MAP



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Legend

Facility Boundary

Reference

Base map comprised of Bing Maps aerial imagery from (c) 2021 Microsoft Corporation and its data suppliers.

600 300 0 600
Feet

Site Map

5-Year Periodic Review
Hazard Potential Classification Assessment - Ash Basin No. 2
Mansfield, DeSoto Parish, Louisiana

Cleco Power LLC
Dolet Hills Power Station

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Drawn By	LMH	09/21/21
Checked By	LMH	09/21/21
Approved By	CVH	09/21/21

Project Number 002-293

Drawing Number 002-293-B012

2
Figure

APPENDIX A

LEVEE BREACH ANALYSIS

CLECO DOLET HILLS POWER STATION
CLECO POWER LLC
DESOTO PARISH, MANSFIELD, LOUISIANA

5-YEAR PERIODIC REVIEW
LEVEE BREACH ANALYSIS REPORT
ASH BASIN NO. 2

OCTOBER 2021

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Providence Project No: 002-293

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1.0 PROJECT DESCRIPTION

Cleco Dolet Hills Power Station is located west of Interstate 49 (I-49) in Mansfield, Louisiana. The power station uses lignite, a type of coal, to generate electricity. The site contains Ash Basin No. 2 that is sized to accept one year's ash production. This report is a review of the 2016 Levee Breach Analysis Report and includes updated costs associated with a levee breach of Ash Basin No.2. Ash Basin No.2 is currently operated in the same manner that it was in 2016, when the initial Levee Breach Analysis Report was completed.

2.0 DATA ACQUISITION

The proposed project is located on Federal Emergency Management Agency (FEMA) map panel 0325C in DeSoto Parish which is bound by Bayou Pierre on the east, US 84 on the north, LA 509 on the west, and Par Rd 140 on the south. The study area is presented in **Figure 1**.

Elevation data for Ash Basin No. 2 is included in **Appendix A**. This includes the maximum and normal operating elevations of Ash Basin No. 2.

Light Detection and Ranging (LIDAR) data was obtained to model existing site conditions both at the power plant and for adjacent properties. Average plant elevation is 240' NAVD 88. It should be noted that the data obtained showed an elevation of 220' NAVD 88 in the area of the coal stockpile. Site investigations conducted as well as historical knowledge of plant operations indicate that the average elevation of the stockpile is much higher than the LIDAR information, therefore model conditions were altered to include a stockpile elevation of 270' NAVD 88.

3.0 HYDRAULIC MODEL DEVELOPMENT

Providence reviewed the LIDAR information that was used to develop the ground model of existing conditions for the project area. In 2016, this information was imported into a hydraulic analysis program in order to model the effects of breaking the levee system. An elevation terrain was generated based on LIDAR data. Channel geometry for the outflows from each of the basins and from the pond was created using raindrop analysis, and cross sections were created by referencing the elevation terrain. Existing pond storage areas were also identified in the model. Cross sections were extended to cover any area of concern both within and surrounding the project site.

Ash Basin No. 2 was analyzed as two separate events. Two scenarios were used in each model: Maximum and Most Probable Loss. In both scenarios, a shear break to the bottom of the levee was assumed. The Maximum scenario flow rate was calculated using a height of water measured from the bottom of pond to the top of levee. The Most Probable Loss scenario flow rate was calculated using a height of water measured from the bottom of pond to the normal operating elevation.

In 2016, the outflow was modeled in GeoHEC-RAS by inputting the steady flow data for each scenario. The upstream boundary for the Most Probable Loss scenario was the normal operating elevation of this pond. The upstream boundary for the Maximum scenario was the top of levee elevation for this pond. The analysis was then computed on the steady flow data. The results for the flood maps and for the cross sections were then generated. It should be noted that these models were generated based on a continuous outflow from the pond as this was determined to be the most conservative way to model a levee breach. Real-world scenarios should be less impactful as the flow rate will steadily decrease as the pond empties.

Providence reviewed the hydraulic analysis program and the GeoHEC-RAS model and determined that these results have not changed from the 2016 inputs and outputs.

4.0 MODELING RESULTS

The results of the levee breach analysis for Ash Basin No. 2 showed that the impact of a breach in the levee system would be routed to the area north of the power station. Minor impacts to power plant property and adjacent woodlands are expected. The analysis showed an increase to headwater at a maximum of 5’ for the Most Probable Loss condition, and a maximum of 6’ for the Maximum Loss condition. These maximum levels occur in the channel located to the west of Ash Basin No. 2. A breach in Ash Basin No. 2 does not affect the plant’s railroad north of the station.

Although the above analysis considered a water column, a breach in the Ash Basins No. 2 would release a minimal amount of bottom ash and it would fall out quickly due to its specific gravity and grain size.

It should be noted that the average elevation shown in **Figures 2** and **Figure 3** represents the average elevation of the entire outflow path. Size and elevation of the coal stockpile influences floodwater direction and intensity. Impacts of floodwater may change should the coal stockpile fall below 240’ NAVD 88.

5.0 COST ANALYSIS

A cost analysis was completed based on the information obtained in the Levee Breach Analysis and available historical cost data. In 2016, a cost estimate was determined for both the Most Probable Loss and the Maximum Loss scenarios for Ash Basin No. 2. The flood area was broken into categories of wooded land, existing channels, plant property, and structures.

The 5-year periodic review determined that the cost estimates would increase according to the Consumer Price Index (CPI) calculator found at the Bureau of Labor Statistics website https://www.bls.gov/data/inflation_calculator.htm). The increase from 2016 to 2021 is 13%.

It is assumed that the levee breach and resulting flood waters would negatively impact onsite property and adjacent timber. The flood waters should dissipate in a relatively short amount of time depending on site conditions at the time of the levee breach. For this reason, it is assumed that only 40 percent of the total offsite impacted acreage would be adversely affected.

Cleanup costs associated with a levee breach are a substantial portion of the total cost for this analysis. Clearing & Grubbing of the impacted properties will be necessary to clear the existing timber that is damaged and was estimated at $2,260 per acre of affected wooded land.

A breach in Ash Basin No. 2 would release a minimal amount of bottom ash which would fall out quickly due to its specific gravity and grain size. The quantity of ash in this pond is constantly changing; therefore, it was assumed that this pond was half full of ash before the levee breach. Elevation data for Ash Basin No. 2 is included in **Appendix A**. Multiple percentages of ash loss were analyzed, all of which were minimal (ranging from 10% to 20%). For the purpose of this report, the cost of a 20% ash loss has been included in the final cost for each scenario of this pond. The volume and cost for all assumed percentages can be found in **Appendix B**. The material would be sent to a landfill instead of being returned to the pond. The cost for removal and hauling ash to a landfill was estimated at $28 per cubic yard of ash.

It is assumed that the length of exposure of pond water to ash would be minimal and would not cause contamination of drinking water, nor would it contaminate the topsoil. For this reason, removal of topsoil is not necessary and was not included in the cost estimate.

It is assumed that any vegetation impacted by a levee breach would need to be re-established to original conditions. Site Preparation/Planting includes the re-establishment of pine/hardwood timber and the spraying of underbrush vegetation during re-establishment and was priced at $565 per acre of affected wooded land. The Loss of Timber Value assumes that valuable timber (pine/hardwood) was present and was priced at $848 per acre. Seeding and Fertilizing was also considered and includes the re-establishment of grass for erosion control of the cleared and grubbed acreage. This was priced at $2,825 per acre of land. Any value of the timber harvested was not included as a discount to the total cost.

It was also assumed that the affected levee of the pond would be rebuilt immediately, and no temporary measures for levee replacement would be necessary. The failure shape of the levee is assumed to be a shear type failure. In order to reconstruct the levee, an additional removal of material is anticipated to safely reconstruct the levee. The cost to reestablish the levee was estimated at $28 per cubic yard and $7.74 per square foot.

Ash Basin No. 2 would cause flooding that showed that the impact of a breach in the levee system would be routed to the area north of the power station. Minor impacts to power plant property and adjacent woodlands are expected.

Details of the Levee Risk Assessment Costs are included in **Appendix B**. The calculations show a total cost for each scenario of this pond. These costs are broken down into the different percentages of ash loss. The total clean-up cost is then divided into the cost of on-site clean-up and the cost of off-site clean-up. These totals are also broken down into the different percentages of ash loss.

A cost for Mobilization/Demobilization was added to each total. For the on-site costs, mobilization/demobilization was estimated at $13,560. For the off-site costs, mobilization/demobilization was estimated at 9%.

The total costs for each scenario of this pond, assuming a 20% ash loss, are as follows:

- For Ash Basin No. 2, clean-up costs for the Most Probable Loss scenario total $4.5 million, and clean-up costs for the Maximum Loss scenario total $5.4 million.

The on-site costs for each scenario of each pond, assuming a 20% ash loss are as follows:

- For Ash Basin No. 2, on-site clean-up costs for the Most Probable Loss scenario total $2.2 million, and on-site clean-up costs for the Maximum Loss scenario total $2.8 million.

The off-site costs for each scenario of each pond, assuming a 20% ash loss are as follows:

- For Ash Basin No. 2, off-site clean-up costs for the Most Probable Loss scenario total $2.3 million, and off-site clean-up costs for the Maximum Loss scenario total $2.6 million.

FIGURE 1

LEVEE BREACH STUDY AREA

1,000 0 1,000

Scale: 1" = 1,000'

Ash Basin No. 2
Levee Breach Study Area

5-Year Periodic Review
Levee Analysis - Ash Basin No. 2
Mansfield, DeSoto Parish, Louisiana

Cleco Power LLC
Dolet Hills Power Station

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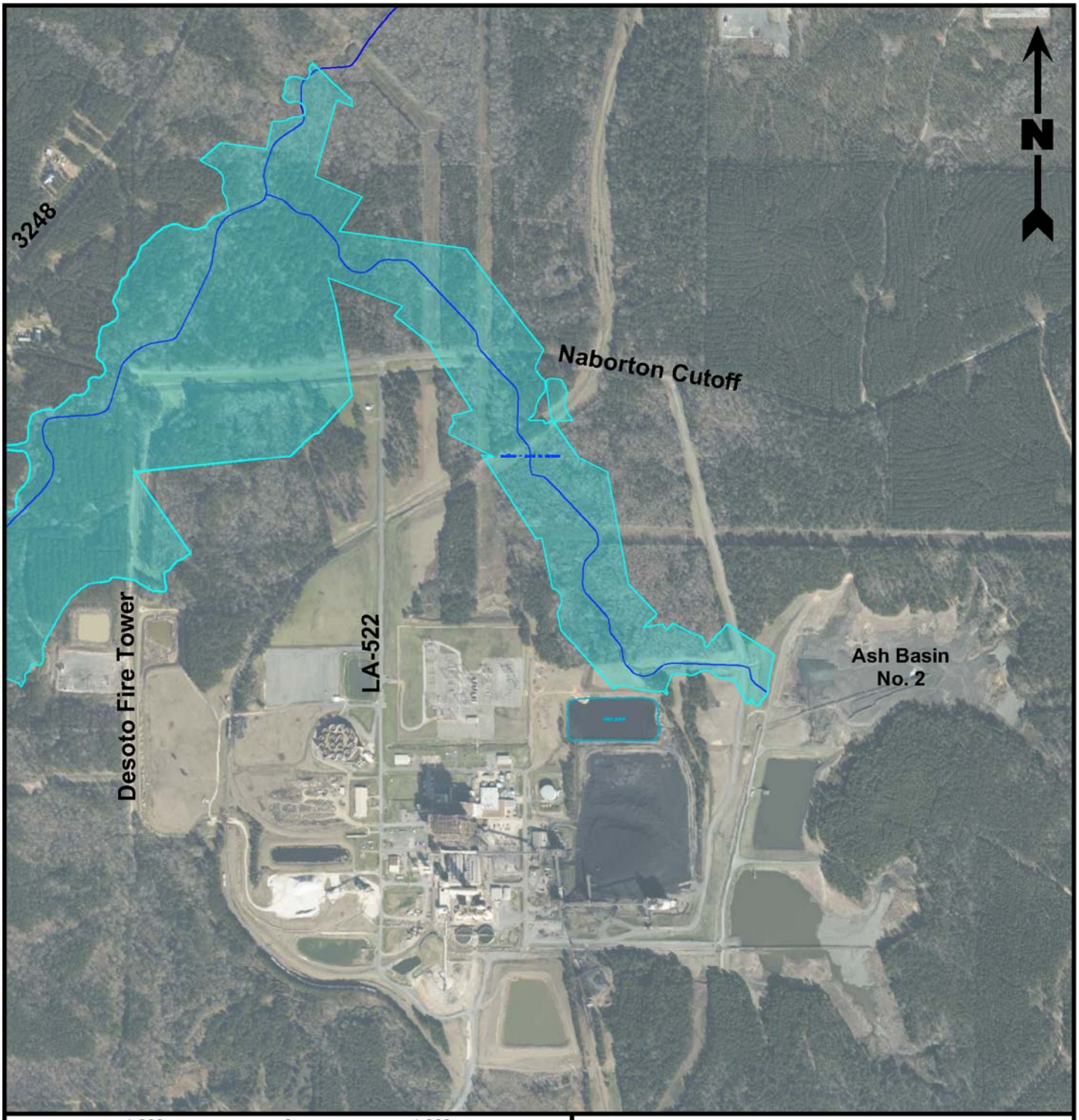
Drawn By	LMH	09/21/21
Checked By	LMH	09/21/21
Approved By	CVH	09/21/21
Project Number 002-293		1 Figure
Drawing Number 002-293-A013		

Reference

Base map comprised of Bing Maps aerial imagery from (c) 2021 Microsoft Corporation and it data suppliers, exported 09/21/21.

FIGURE 2

ASH BASIN NO. 2 MOST PROBABLE LOSS



1,000 0 1,000

Scale: 1" = 1,000'

Legend

Most Probable Loss (Avg. El. 186.65')

Reference

Base map comprised of Bing Maps aerial imagery from (c) 2021 Microsoft Corporation and it data suppliers, exported 09/21/21.

Ash Basin No. 2
Most Probable Loss

5-Year Periodic Review
Levee Analysis - Ash Basin No. 2
Mansfield, DeSoto Parish, Louisiana

Cleco Power LLC
Dolet Hills Power Station

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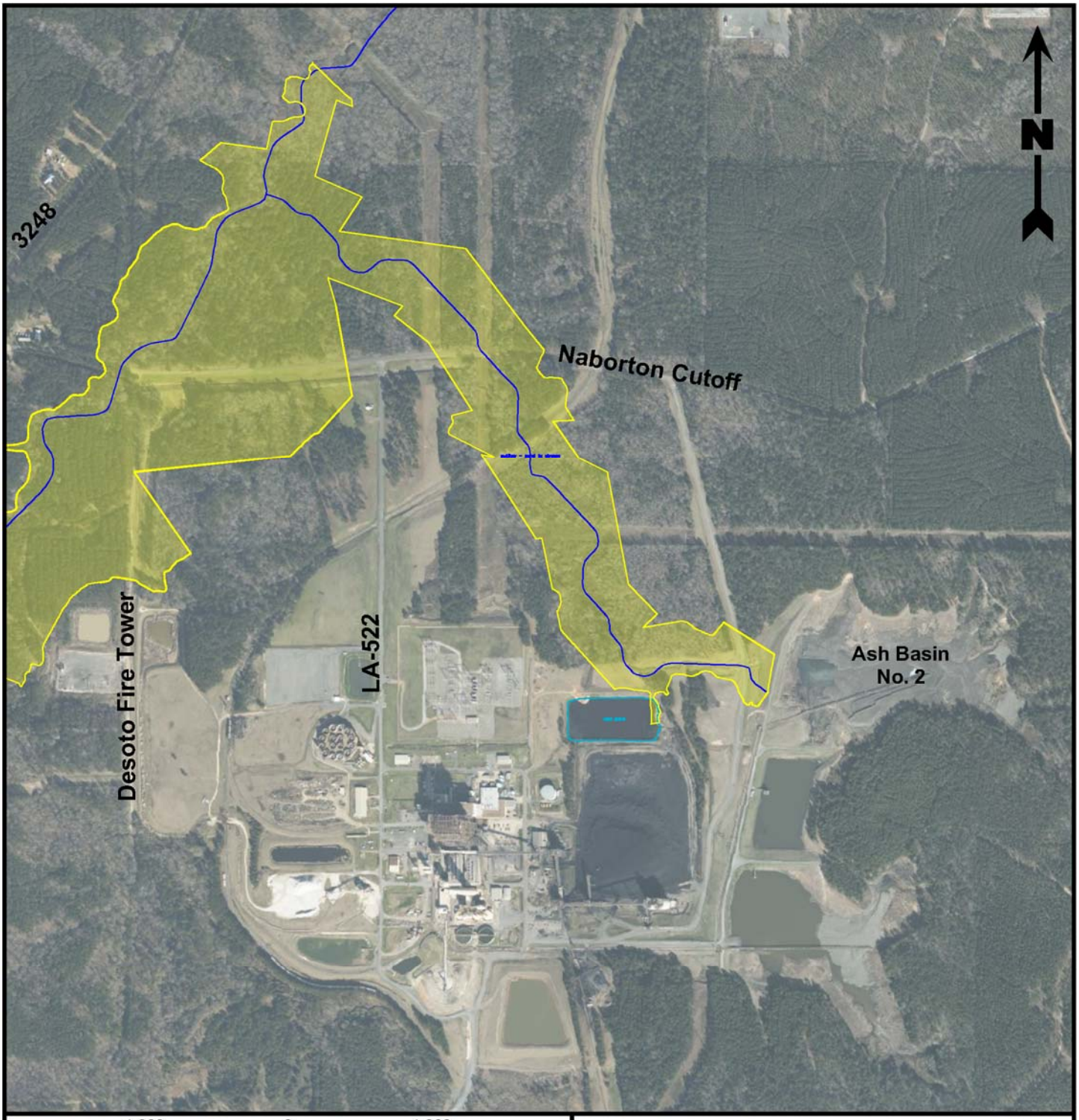
Project Number 002-293

Drawing Number 002-293-A014

2 Figure

FIGURE 3

ASH BASIN NO. 2 MAXIMUM LOSS



1,000 0 1,000

Scale: 1" = 1,000'

Legend

Maximum Loss (Avg. El. 186.81')

Reference

Base map comprised of Bing Maps aerial imagery from (c) 2021 Microsoft Corporation and it data suppliers, exported 09/21/21.

Ash Basin No. 2 Maximum Loss

5-Year Periodic Review
Levee Analysis - Ash Basin No. 2
Mansfield, DeSoto Parish, Louisiana

Cleco Power LLC
Dolet Hills Power Station

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Approved By	CVH	09/21/21

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Drawing Number 002-293-A015

3 Figure

APPENDIX A

ACQUIRED DATA

Facility Name:		Cleco Dolet Hills Power Station	
Address:		963 Power Plant Rd. Mansfield, LA	
Surface Impoundment Name :	Ash Basin No. 2	**Owner:**	Cleco Power LLC
Surface Impoundment ID:	P-0037	**Operator:**	Cleco Power LLC
Nearest City:	Mansfield	**Parish:**	DeSoto
GENERAL			
Dam Status:	Operational	**Year Built:**	1984
Latitude:	32° 02.14’ N	**Longitude:**	93° 33.65’ W
Dam Size:	420 Acre-Feet @ 243.5 ft.		
Bottom of Pond Elevation	215 ft. NAVD 88	**Top of Dike Elevation:**	246 ft. NAVD 88
Low Operating Level Elevation:	225 ft. NAVD 88	**High Operating Level Elevation:**	240.5 ft. NAVD 88
High Operating Level Storage:	335 acre-feet @ 240.5 ft. NAVD 88		
Maximum Storage:	420 acre-feet @ 243.5 ft. NAVD 88		
Maximum Waste Surface Area:	31 Acres		
Spillway/Overflow Structure Type:	Internal adjustable concrete stoplog overflow weir structure. Also, has an auxiliary overflow spillway. The auxiliary spillway has 6" riprap on the bottom and sides of the spillway up to elevation 246.0 NAVD 88.		

APPENDIX B

CALCULATIONS

APPENDIX B
LEVEE BREACH COST ANALYSIS
ASH BASIN NO. 2

Description	Unit	Most Probable Loss	Maximum Loss
Wooded land on-site	acres	29.49	30.73
Wooded land off-site	acres	42.68	44.20
Existing channel (east of coal pile)	acres	0.00	0.00
Coal pond	acres	0.00	0.00
Coal pile	acres	0.00	0.00
Railroad (on-site)	acres	0.31	0.26
Roadways (on-site)	acres	0.74	0.77
Area of levee repair	sq ft	12,152	12,152
Volume of levee repair	cu yd	9,299	9,299
10% ash leaving pond	cu yd	61,710	75,020
15% ash leaving pond	cu yd	92,565	112,530
20% ash leaving pond	cu yd	123,420	150,040
Plant property (non-wooded land)	acres	7.71	14.94
Percentage of flood that is on-site (wooded land on-site, railroad, roadways & non-wooded land)		47.27%	51.38%

Ash Basin No. 2 Costs

Description	Unit	2021 Unit Price	Most Probable Loss	Maximum Loss
Site prep/planting on-site[1]	acre	$565	$16,661	$17,365
Site prep/planting off-site[1]	acre	$565	$24,112	$24,972
Loss of timber value on-site[2]	acre	$848	$24,992	$26,047
Loss of timber value off-site[2]	acre	$848	$36,168	$37,457
Clearing & grubbing on-site	acre	$2,260	$66,645	$69,459
Clearing & grubbing off-site	acre	$2,260	$96,448	$99,887
Seeding & fertilizing on-site [3]	acre	$2,825	$105,084	$129,024
Seeding & fertilizing off-site [3]	acre	$2,825	$120,560	$124,858

APPENDIX B
LEVEE BREACH COST ANALYSIS
ASH BASIN NO. 2

Levee Repair	Unit	2021 Unit Price	Most Probable Loss	Maximum Loss
Incorporation of lime, reprocessing, recompacting clay material on exterior of slope	cu yd	$28	$262,703	$262,703
Purchase and installation of structural geogrid material	sq ft	$0.57	$6,866	$6,866
Purchase and installation of HDPE membrane	sq ft	$0.47	$5,767	$5,767
Purchase and installation of fabric formed concrete revetment	sq ft	$6.22	$75,525	$75,525
Purchase and placement of erosion control matting	sq ft	$0.40	$4,806	$4,806
Seeding and fertilization	sq ft	$0.08	$961	$961
		Levee Repair Total	**$356,628**	**$356,628**

Ash Removal and Haul to Landfill[4]	Unit	2021 Unit Price	Most Probable Loss	Maximum Loss
10% ash leaving pond	cu yd	$28	$1,743,308	$2,119,315
15% ash leaving pond	cu yd	$28	$2,614,961	$3,178,973
20% ash leaving pond	cu yd	$28	$3,486,615	$4,238,630

Mobilization/Demobilization on-site	$13,560	$13,560
Mobilization/Demobilization off-site	9%	9%

On-site Costs[5]

10% ash loss	**$1,407,575**	**$1,701,030**
15% ash loss	**$1,819,578**	**$2,245,504**
20% ash loss	**$2,231,581**	**$2,789,978**

Off-site Costs

10% ash loss	**$1,304,763**	**$1,436,647**
15% ash loss	**$1,805,966**	**$1,998,403**
20% ash loss	**$2,307,170**	**$2,560,159**

Total Costs

10% ash loss	**$2,712,338**	**$3,137,677**
15% ash loss	**$3,625,544**	**$4,243,907**
20% ash loss	**$4,538,751**	**$5,350,137**

NOTES:

1. Includes the re-establishment of pine/hardwood timber and the spraying of underbrush vegetation.

2. Assumes that valuable timber (pine/hardwood) is present.

3. Includes the re-establishment of grass for erosion control.

4. Assumes that half of the pond is filled with ash, and minimal amounts would be released.

5. Includes all levee repair costs and all costs for ash clean up that occurs on site. Assumes any ash that falls on the levee is included in the levee repair.

6. Assumes ash leaving pond spreads evenly throughout affected on-site area and 40% of the off-site area.

7. Timber value once purchased and brought to mill is not included.

8. Assume no contamination of topsoil; therefore, no removal necessary.

9. Assume length of exposure of pond water to ash is minimal and will not cause contamination of drinking water.

10.Assume affected pond is being rebuilt immediately and no temporary measures for levee replacement are necessary.

11. 2016 unit costs have been increased by 13% based on 2021 CPI adjustment found at Bureau of Labor Statistics.

APPENDIX B
LEVEE BREACH COST ANALYSIS
ASH BASIN NO. 2

Ash Basin No. 2 Ash

Pond area (acre) 31.0

	Most Probable Loss	Maximum Loss
High Operating Level (ft)	241	
Top of Levee (ft)	246	246
Levee Toe (ft)	215	215
Half Full of Ash (ft)	13	15.5
Volume of Existing Ash (yd^3)	617,100	750,200

Volume of Ash Leaving Pond (yd^3):	Most Probable Loss	Maximum Loss
10%	61,710	75,020
15%	92,565	112,530
20%	123,420	150,040

Ash Basin No. 2 Levee

Slope = 3:1

	Most Probable Loss	Maximum Loss
Width At Break (ft)	186	186
Length Across Top	62	62
Depth of Failure	31	31
Volume of Failure	9,299	9,299

APPENDIX B

P.E. CERTIFICATION

CLECO BRAME ENERGY CENTER
ASH BASIN NO. 2
5-YEAR PERIODIC REVIEW - CCR HAZARD POTENTIAL CLASSIFICATION ASSESSMENT

PROFESSIONAL ENGINEER CERTIFICATION

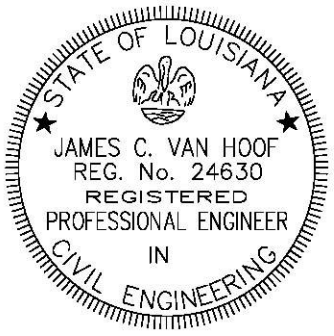
I hereby certify that I have performed the 5-year periodic review of the hazard potential classification assessment for Cleco's Dolet Hills Power Station Ash Basin No. 2 in accordance with the CCR requirements at 40 CFR 257.73(a)(2). This 5-year periodic review of the hazard potential classification assessment has determined that Ash Basin No. 2 continues to be classified as a low hazard potential surface impoundment.

James C. Van Hoof
Name

24630 **LA**
Registration No. State

James C. Van Hoof, P.E.
Signature

10/14/2021
Date



(Seal)