

SEPTEMBER 2018

CLECO POWER LLC BRAME ENERGY CENTER



UNSTABLE AREAS ASSESSMENT

BOTTOM ASH POND

Prepared By:

**Providence Engineering and
Environmental Group LLC**

1201 Main Street

Baton Rouge, Louisiana 70802

(225) 766-7400

www.providenceeng.com

Project Number 002-213



TABLE OF CONTENTS

| <u>Section</u> | <u>Page</u> |
|------------------------------------|--------------------|
| 1.0 INTRODUCTION | 1 |
| 2.0 UNSTABLE AREAS ASSESSMENT..... | 1 |
| 3.0 CONCLUSION | 2 |

LIST OF FIGURES

| <u>Figure</u> | |
|----------------------|-------------------|
| 1 | Site Location Map |
| 2 | Site Map |

LIST OF APPENDICES

| <u>Appendix</u> | |
|------------------------|--------------------|
| A | P.E. Certification |

1.0 INTRODUCTION

Providence was contracted by Cleco Power LLC (Cleco) to conduct an unstable areas assessment of the Bottom Ash Pond at Cleco's Brame Energy Center. Recent Coal Combustion Residual (CCR) regulations at 40 CFR 257.64 established requirements for owners and operators to conduct an unstable areas assessment by a qualified professional engineer.

40 CFR 257.64 (a) states:

An existing or new CCR landfill, existing or new CCR surface impoundment, or any later expansion of a CCR unit must not be located in an unstable area unless the owner or operator demonstrates by the dates specified in paragraph (d) of this section that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components of the CCR unit will not be disrupted.

This assessment must, at a minimum, consider the following factors when determining whether an area is unstable:

- On-site or local soil conditions that may result in significant differential settling
- On-site or local geologic or geomorphologic features
- On-site or local human-made features or events (both surface and subsurface)

The Cleco Brame Energy Center is located near Lena in Rapides Parish, Louisiana. A site location map showing the Brame Energy Center is included as **Figure 1**.

This unstable area assessment pertains to the Bottom Ash surface impoundment (Pond) utilized for the Unit 2 coal-fired generation unit. A site map for the Bottom Ash Pond is included as **Figure 2**. For an existing CCR surface impoundment, the unstable areas assessment must be completed no later than October 17, 2018.

2.0 UNSTABLE AREAS ASSESSMENT

40 CFR 257.53 states that an unstable area means a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity, including some or all of the structural components of the CCR unit that are responsible for preventing releases from such unit. Unstable areas can include poor foundation conditions, areas susceptible to mass movements, and karst terrains.

On-site or Local Soil Conditions

Providence reviewed the existing soil borings that were completed for the initial design of the Bottom Ash Pond. Providence also completed soil borings in the existing levee associated with the surface impoundment. Providence reviewed the soil conditions in the boring logs and determined that the soil conditions are stable and should not cause excessive differential settlement to the extent that the stability of the CCR impoundment, or its associated features, will be compromised.

The Bottom Ash Pond is underlain with clays that extends 20 feet (terminal depth of the borings) in all of the borings except one. For that boring, the clay extends 12 feet. This provides a firm and secure foundation that maintains its integrity and will not be disrupted as a result of uneven settlement induced by hydrocompaction. Also, the clay liner provides a foundation that prevents sudden differential movement resulting from CCR placement. These areas have not been subject to mass movement in the past and are not expected to be in the future.

On-site or Local Geologic or Geomorphic Features

Providence has inspected the site, reviewed geological reports, reviewed boring logs, and reviewed topographic maps to evaluate the local geologic and geomorphic features that could cause the CCR unit to be unstable. No features were found that would cause the CCR unit to be unstable. The Bottom Ash Pond is not located in karst terrain, therefore sinkholes, vertical shafts, sinking streams, caves, seeps, large springs, and blind valleys are not expected.

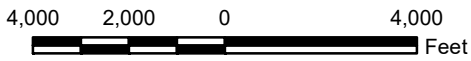
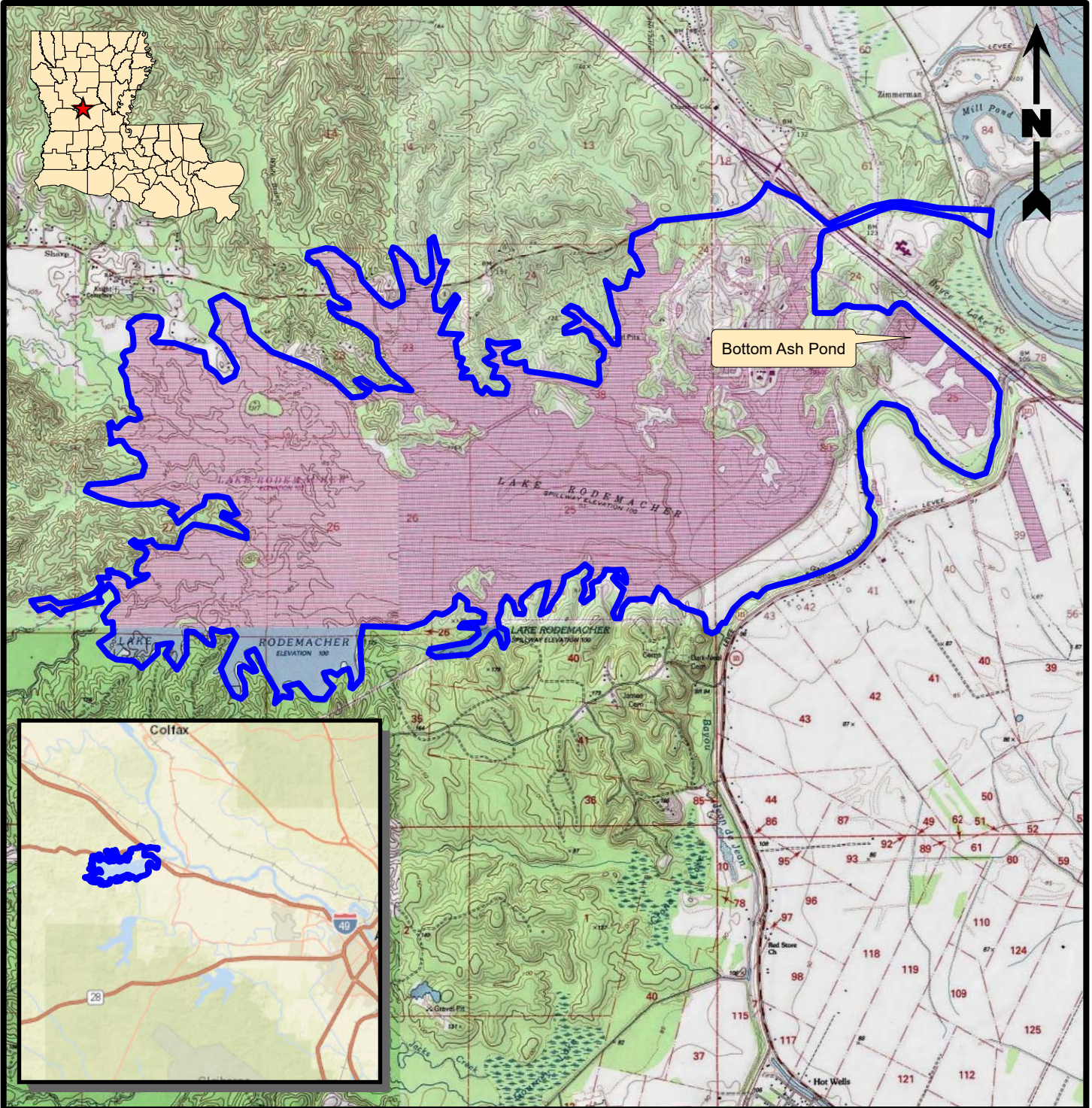
On-site or Local Human-made Features or Events

Providence reviewed the man-made features and activities associated with the CCR unit with respect to cut and fill, installation of culverts and piping, and any associated man-made features of the Bottom Ash Pond. The dikes were mechanically compacted to a density sufficient to withstand the range of loading conditions for the daily operation of the unit. The structural stability assessment was consistent with recognized and generally accepted good engineering practices. No anthropogenic features were found that would adversely affect the stability of the CCR unit.

3.0 CONCLUSION

Based on the results from the unstable areas assessment, the Bottom Ash Pond's on-site or local soil conditions, geologic or geomorphologic features, and human-made features or events, Providence concludes that the surface impoundment is not located in unstable areas. The Bottom Ash Pond meets the requirements at 257.64 of the CCR regulations. **Appendix A** contains a P.E. Certification that attests to this assessment.

FIGURE 1
SITE LOCATION MAP



Legend

Property 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

Unstable Areas Assessment - Bottom Ash Pond
Boyce, Rapides Parish, Louisiana

Cleco Power LLC
Brame Energy Center



PROVIDENCE



| | | |
|-------------|-----|----------|
| Drawn By | LMM | 06/21/17 |
| Checked By | LMH | 06/21/17 |
| Approved By | CVH | 06/21/17 |

| | | |
|----------------|--------------|-------------|
| Project Number | 002-213 | 1 Figure |
| Drawing Number | 002-213-A009 | |

FIGURE 2
SITE MAP

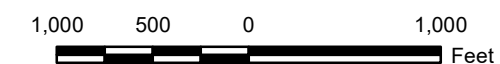


Legend

-  Property Boundary
-  Bottom Ash Pond

Reference

Base map comprised of Google Earth aerial imagery from 10/03/14.



Site Map

Unstable Areas Assessment - Bottom Ash Pond
Boyce, Rapides Parish, Louisiana

Cleco Power LLC
Brame Energy Center



| | | |
|----------------|--------------|----------|
| Drawn By | LMM | 06/21/17 |
| Checked By | LMH | 06/21/17 |
| Approved By | CVH | 06/21/17 |
| Project Number | 002-213 | |
| Drawing Number | 002-213-B010 | |
| | 2 | Figure |

APPENDIX A
P.E. CERTIFICATION

**CLECO BRAME ENERGY CENTER
BOTTOM ASH POND
CCR UNSTABLE AREAS ASSESSMENT**

PROFESSIONAL ENGINEER CERTIFICATION

I hereby certify that I have performed an unstable areas assessment for Cleco's Brame Energy Center Bottom Ash Pond in accordance with the 40 CFR 257.64 CCR requirements. Based on the results from the unstable areas assessment, the Bottom Ash Pond is not located in unstable areas.

James C. Van Hoof

Name

24630

Registration No.

LA

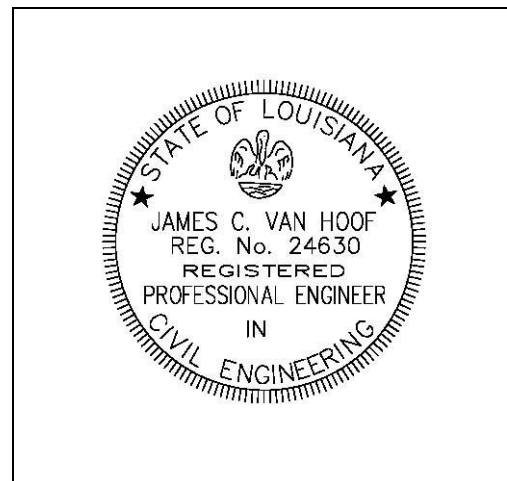
State

James C. Van Hoof, P.E.

Signature

9/20/18

Date



(Seal)