



**BRAME ENERGY CENTER
LENA, LOUISIANA**

**MONITORING WELL
NETWORK CERTIFICATION**

MONITORING WELL NETWORK

1.0 Introduction

The U.S. Environmental Protection Agency (EPA) published a final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA). The rule applies to the Cleco Power LLC Brame Energy Center (BEC). A site location map is provided in Figure 1. BEC has two permitted facilities that accept CCR: the Bottom Ash and Fly Ash Ponds, as shown in Figure 2.

The CCR Rule, 40 CFR Subpart D-Standards for the Disposal of CCRs, Section §257.91 requires a groundwater monitoring system that consists of sufficient number of wells at appropriate locations and depths based on site-specific technical information, to yield groundwater samples from the uppermost aquifer that:

- Accurately represent the quality of both background groundwater, and groundwater passing the boundary of the CCR unit; and
- Monitor potential contaminant pathways.

The groundwater monitoring system at BEC meets those requirements, as described below.

2.0 Site Hydrogeology Summary

The Bottom Ash and Fly Ash Ponds are situated on the aquifer recharge area for the Red River natural levee and/or Alluvial Aquifer, as well as Lake Rodemacher. Since the Bottom Ash and Fly Ash Ponds are located in the Red River Alluvium, all upgradient and downgradient monitoring wells for these CCR facilities have been installed in these deposits.

Review of geological reports indicates that Louisiana Alluvial Aquifer groundwater quality is reported by the USGS to be primarily limited to use for industrial and agricultural purposes. This is due to excessive concentrations of dissolved solids, hardness, iron, or localized salinity. The natural groundwater quality of these aquifer systems is generally considered not suitable for drinking water supply purposes without first undergoing appropriate water treatment. The Louisiana Department of Natural Resources (LDNR) issued an advisory in 2009 addressing the recommended uses of these alluvial aquifers. Furthermore, it is reported that dissolved metals, namely arsenic, have been, and are expected to be, detected in groundwater in localized areas of these aquifers (LDNR, 2009).

Louisiana Department of Natural Resources, Office of Conservation, 2009. “General Water Quality Summary, Louisiana Groundwater - Alluvial Aquifer Systems”, Louisiana Department of Natural Resources, Baton Rouge, LA, 1 sheet.

3.0 Groundwater Monitoring System

Groundwater monitoring wells have been installed in the uppermost, laterally continuous water bearing zone present beneath the CCR facilities at BEC. Since the areas immediately upgradient of the Bottom Ash and Fly Ash Ponds are situated on Terrace deposits, the background monitoring wells have been installed in alternative locations, per §257.91.1. Thus, all background and

compliance monitoring wells are screened in the Red River Alluvial deposits. Monitoring well information is included in Table 1, and the monitoring well locations are provided in Figure 2.

CERTIFICATION

I hereby certify that the groundwater monitoring system described in this report for the Brame Energy Center, owned and operated by Cleco Power, LLC, has been designed and constructed to meet the requirements of the Coal Combustion Residual Rule 40 CFR §257.91. I am a duly licensed Professional Engineer under the laws of the State of Louisiana.

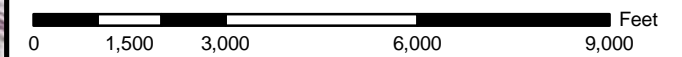
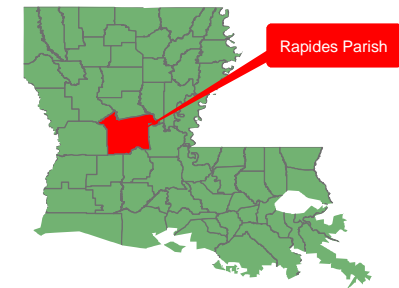
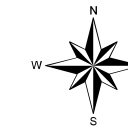
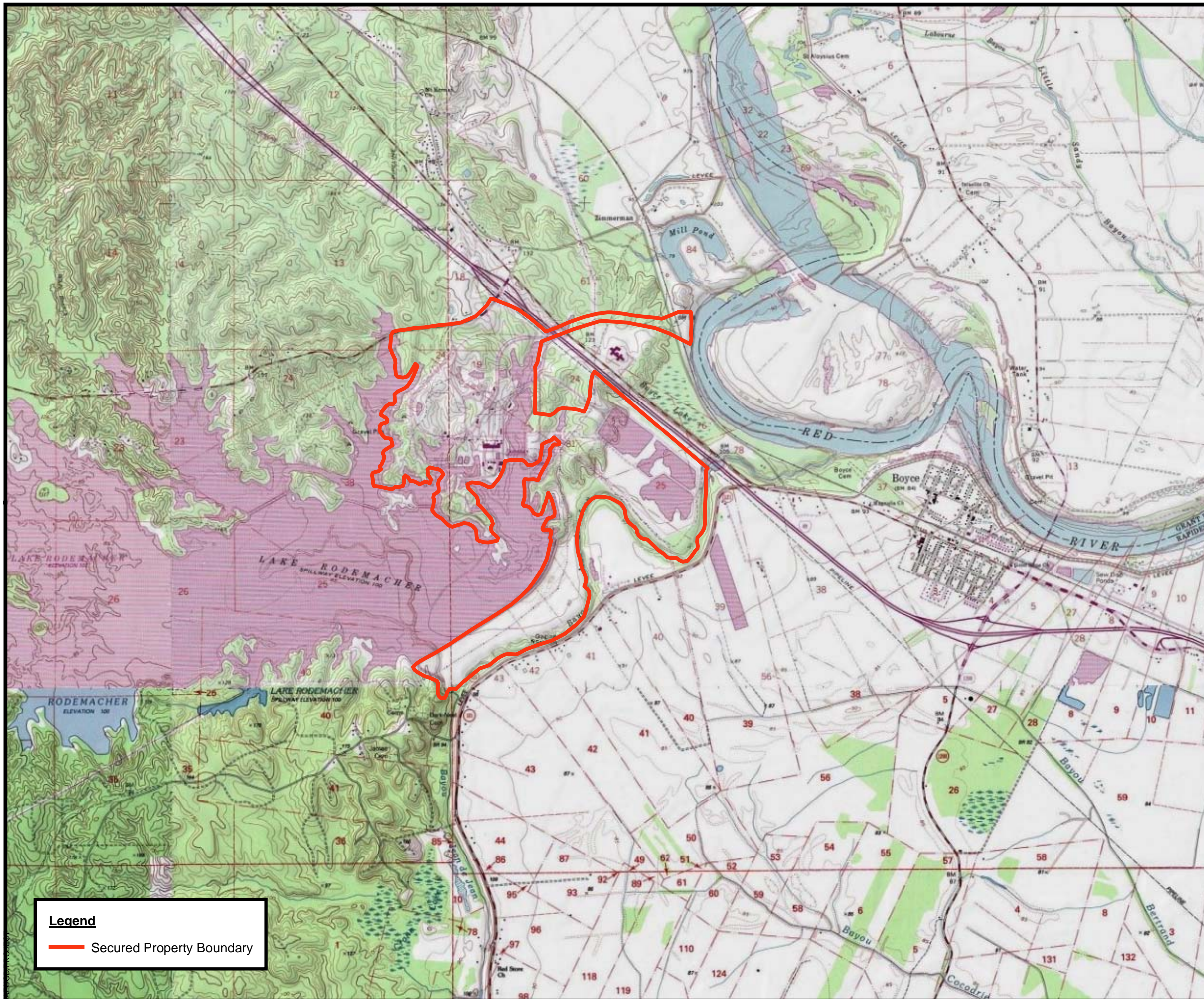


A handwritten signature in blue ink, appearing to read "Bradley E. Bates".

_____, P.E.

Date: 3/7/17

Louisiana Registration No.: 27124



Reference

U.S.G.S. TOPOGRAPHIC MAPS "LENA, LOUISIANA", "BOYCE, LOUISIANA", "JERICO, LOUISIANA", AND "GARDNER, LOUISIANA."



Site Location Map

Rapides Parish, Louisiana

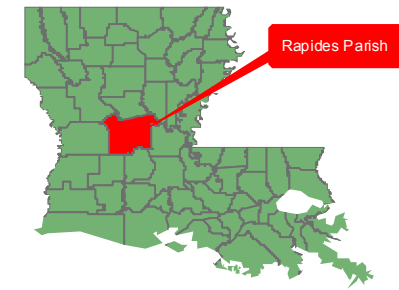
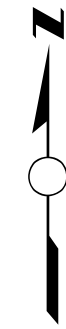
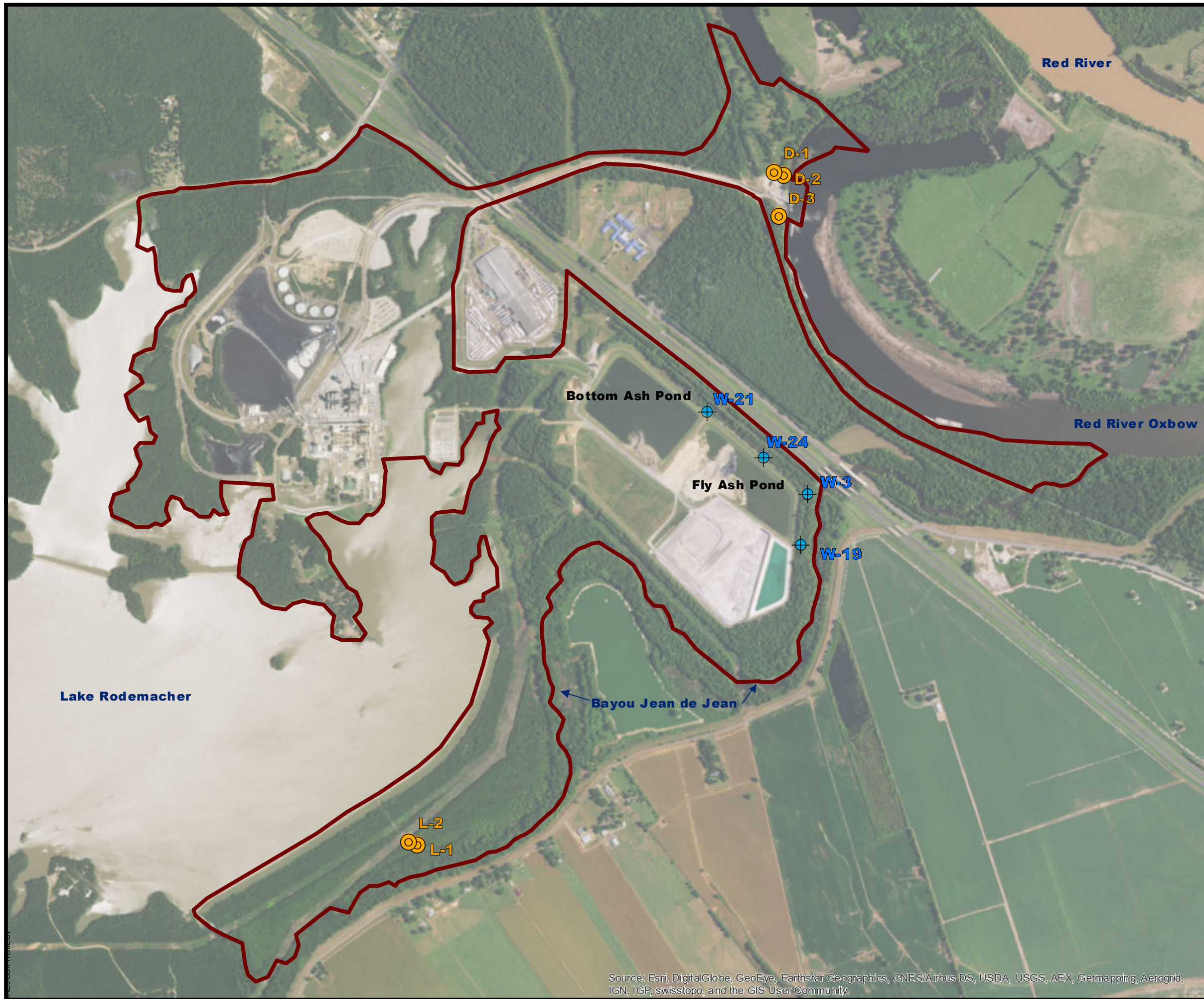


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Checked:	JM
Approved:	RS
Date:	11/08/10
Dwg. No.:	01-10-0071-A003




Figure 1

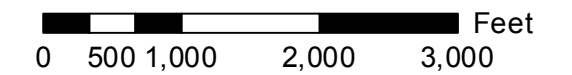
Legend

— Secured Property Boundary



Legend

-  CCR Rule Compliance Wells
-  CCR Rule Background Wells
-  Secured Property Boundary



CLECO Power LLC
Brame Energy Center

**CCR Rule
Monitoring Well Location Map**
Rapides Parish, Louisiana



Drawn:	JP
Checked:	RS
Approved:	JM
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Dwg. No.:	01-16-0160-A003

Figure 2

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Table 1
Monitoring Well Construction Data

Cleco Brame Energy Center
Bottom and Fly Ash Ponds

Well Number	D-1	D-2	D-3	L-1	L-2
Background (B) or Compliance (C)	B	B	B	B	B
Latitude (dd°mm'ss")	31°24'23.84"	31°24'23.41"	31°24'17.52"	31°22'47.68"	31°22'48.17"
Longitude (dd°mm'ss")	92°41'53.62"	92°41'52.12"	92°41'52.95"	92°42'53.61"	92°42'55.01"
Casing Elevation (ft NGVD)	99.38	99.36	97.37	86.15	86.68
Concrete Pad Elevation (ft NGVD)	96.59	97.10	94.50	83.05	83.73
Well Depth (ft bgs)	40	46	35.5	36	40
Screen Length (ft)	10	10	10	10	10
Top of Screen (ft NGVD)	67.2	61.7	69.3	58.8	54.6
Bottom of Screen (ft NGVD)	57.2	51.7	59.3	48.8	44.6
Screen Slot Size (inches)	0.010	0.010	0.010	0.010	0.010
Casing Diameter (inches) & Material	2" PVC	2" PVC	2" PVC	2" PVC	2" PVC

Well Number	W-3	W-19	W-21	W-24
Background (B) or Compliance (C)	C	C	C	C
Latitude (dd°mm'ss")	31°23'37.79"	31°23'30.48"	31°23'49.57"	31°23'43.05"
Longitude (dd°mm'ss")	92°41'48.33"	92°41'50.26"	92°42'05.00"	92°41'55.61"
Casing Elevation (ft NGVD)	92.07	94.99	87.86	83.71
Concrete Pad Elevation (ft NGVD)	88.87	92.47	85.23	81.03
Well Depth (ft bgs)	77	55	54.5	55
Screen Length (ft)	10	10	10	10
Top of Screen (ft NGVD)	25.7	48.0	41.2	38.4
Bottom of Screen (ft NGVD)	15.7	38.0	31.2	28.4
Screen Slot Size (inches)	0.010	0.010	0.010	0.010
Casing Diameter (inches) & Material	2" PVC	2" PVC	2" PVC	2" PVC

Notes:

bgs = below ground surface

PVC = polyvinyl chloride