

CLECO POWER LLC DOLET HILLS POWER STATION

**ASH BASINS NO. 1 AND NO. 2
MANSFIELD, LA**

**2023 Annual Groundwater Monitoring Report
for the Coal Combustion Residuals Rule**

January 2024



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EXECUTIVE SUMMARY

- Current groundwater monitoring program status: detection monitoring.
- Confirmed Statistically Significant Increases in downgradient monitoring wells for this reporting period: none.

1.0 INTRODUCTION

Cleco Power LLC (Cleco) hereby presents the 2023 Annual Groundwater Monitoring report for Ash Basins No. 1 and No. 2 at the Dolet Hills Power Station (DHPS) located in Mansfield, Louisiana (**Figure 1**). This report summarizes groundwater sampling and analysis activities completed in accordance with applicable portions of the U.S. Environmental Protection Agency (EPA) Coal Combustion Residuals (CCR) Rule.

2.0 FACILITY INFORMATION

Cleco owns and operates the DHPS located at 963 Power Plant Road, Mansfield, Louisiana 71052. The Ash Basins in service at the plant have been permitted to operate by the Louisiana Department of Environmental Quality (LDEQ) Waste Permits Division. The materials deposited in these facilities are non-hazardous, on-site-generated materials only.

As required by the CCR Rule part §257.90, DHPS has a groundwater monitoring well system to evaluate the groundwater quality conditions near the Ash Basins. The monitoring system primarily consists of monitoring wells installed previously to conduct groundwater monitoring required by DHPS's LDEQ approved solid waste permits, and other monitoring wells installed more recently. A total of twelve monitoring wells have been installed per applicable portions of §257.91. The uppermost water bearing zone that is laterally continuous beneath the Ash Basins is referred to as Zone 4. Locations of the monitoring wells can be found on **Figure 2**, and a table of monitoring well construction details can be found in **Table 1**.

3.0 FIELD ACTIVITIES

Groundwater sampling events were conducted by Cleco approved contract personnel in accordance with applicable portions of §257.93. Semi-annual detection monitoring sampling events were conducted in March and September 2023.

The depth-to-water below the top of each well casing was measured and recorded prior to purging and sampling each well during each sampling event. Water levels were measured to the nearest 0.01 foot from the top of casing using an electronic water level indicator. Total depth of each well was also measured to confirm that the screened interval was open to groundwater flow. Water level measurements were recorded in groundwater sampling forms. The water level measurements were subtracted from the top of casing elevations to obtain the groundwater elevations.

Groundwater purging and sampling activities were conducted using electric submersible pumps. These activities were conducted in accordance with applicable portions of Sections 6.1, 6.2, 6.3 and 8.1.4 of the *Standard Guide for Sampling Groundwater Monitoring Wells* (ASTM International, Publication D4448). Non-dedicated sampling equipment which came into contact with groundwater samples was decontaminated prior to sampling each well to reduce the potential for cross-contamination. Groundwater samples were collected by filling the sample containers directly from the disposable tubing connected to the pump or from a disposable bailer. Care was taken to minimize agitation of the samples. Samples were placed in laboratory-provided plastic containers with appropriate preservatives, per Section 9 of ASTM D4448. Samples were properly preserved on ice in the field and shipped to Waypoint Analytical of Ridgeland, Mississippi, or Eurofins Environment Testing America's Pensacola, Florida laboratory for analysis of the CCR groundwater detection monitoring parameters by the following methods: chloride, fluoride and sulfate by 300.0; total dissolved solids (TDS) by 2540C; and metals by 6010/6020. Full chain-of-custody protocols were observed during

sample collection, transportation, and analysis. Sample shipment/transport procedures were conducted per Sections 9.9 through 9.11 of ASTM D4448.

4.0 GROUNDWATER FLOW EVALUATION

Zone 4 is the most suitable water-bearing zone to monitor groundwater quality at the Ash Basins. The potentiometric surface maps prepared for Zone 4 (**Figures 3 and 4**) indicate that groundwater flow in Zone 4 mimics the topography of the site. This pattern of groundwater flow is consistent in the potentiometric surface maps, indicating little significant fluctuation in groundwater flow.

Groundwater flow rate was evaluated using the groundwater flow equation, $v = [k(dh/dl)] / n_e$. For this equation, v is groundwater flow velocity in ft/day, k is hydraulic conductivity in ft/day, dh/dl is hydraulic gradient in ft/ft, and n_e is effective porosity (unitless).

For Zone 4, hydraulic conductivity (k) values ranging from 2.0E-07 to 1.4E-02 ft/day were assumed based on slug tests completed at the site. Hydraulic gradient (dh/dl) values are listed below based on potentiometric surface maps completed for Zone 4. An effective porosity (n_e) of 0.2 was assumed based on the soil types of Zone 4 (Fetter, 2001). Using these values, estimated groundwater flow rates (v) are listed below.

Date	Hydraulic Gradient (feet/feet)	Estimated Groundwater Flow Velocity (feet/day)
March 2023	6.0E-06 to 5.0E-02	6.0E-12 to 3.5E-03
September 2023	6.0E-06 to 5.0E-02	6.0E-12 to 3.5E-03

It is important to note that this is an advective rate and does not take into account potential hydrogeological heterogeneities such as adsorption, biodegradation, dispersion, or other retarding factors in the groundwater flow in this zone. Additionally, variations in the advective flow may occur due to potential lateral geological heterogeneities.

5.0 ANALYTICAL RESULTS

Groundwater samples collected at the Ash Basins were analyzed for the CCR Rule detection monitoring parameters pH, boron, calcium, chloride, fluoride, sulfate and TDS using appropriate EPA approved analytical methods. Results show frequent detections of all parameters in both up- and downgradient monitoring wells at the Ash Basins. Analytical results are provided in **Table 2**.

6.0 STATISTICAL EVALUATION

Statistical evaluations of groundwater data have been performed per applicable portions of §257.93.f. The goal of the statistical evaluation is to determine if there is statistically significant evidence to show that facility operations may have adversely affected groundwater quality. Statistical evaluations are conducted to determine if there are any statistically significant increases (SSIs) between groundwater quality upgradient and groundwater quality downgradient of the Ash Basins.

Due to statistically significant variation found in upgradient monitoring well data, all detection monitoring parameters were statistically evaluated using intrawell prediction limits. Intrawell tests are within well comparisons. In the case of limit-based tests, historical data from within a given monitoring well for a given parameter are used to construct a limit. Compliance points are compared to the limit to determine whether a change is occurring on a per-well/per-parameter basis. Normal distributions of

data values use parametric methods. Non-normal distributions use non-parametric methods, in which case, the prediction limit is based on the highest value in the background data set.

Intrawell limit-based tests are recommended when there is evidence of spatial variation in groundwater quality, particularly among upgradient monitoring wells, as it is inappropriate to pool those data across monitoring wells for the purpose of creating interwell limits for comparison with compliance monitoring well data. Intrawell tests may be used at both new and existing facilities. Data used in the intrawell limit-based tests were screened for outliers, which, if found, were removed from the background data set prior to constructing limits for each well/parameter pair.

Verification resampling for SSIs is only conducted for SSIs generated in downgradient wells via intrawell methodology. Intrawell statistics have been performed on all wells; however, since the goal of the statistical evaluation is to determine if there is statistically significant evidence to show that facility operations may have adversely affected groundwater quality downgradient of the facilities, only downgradient wells are subject to verification resampling.

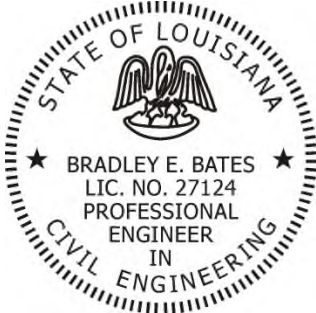
Intrawell statistical analysis of the 2023 detection monitoring groundwater data showed that no confirmed SSIs were generated in downgradient wells at the Ash Basins.

7.0 CONCLUSIONS AND RECOMMENDATIONS

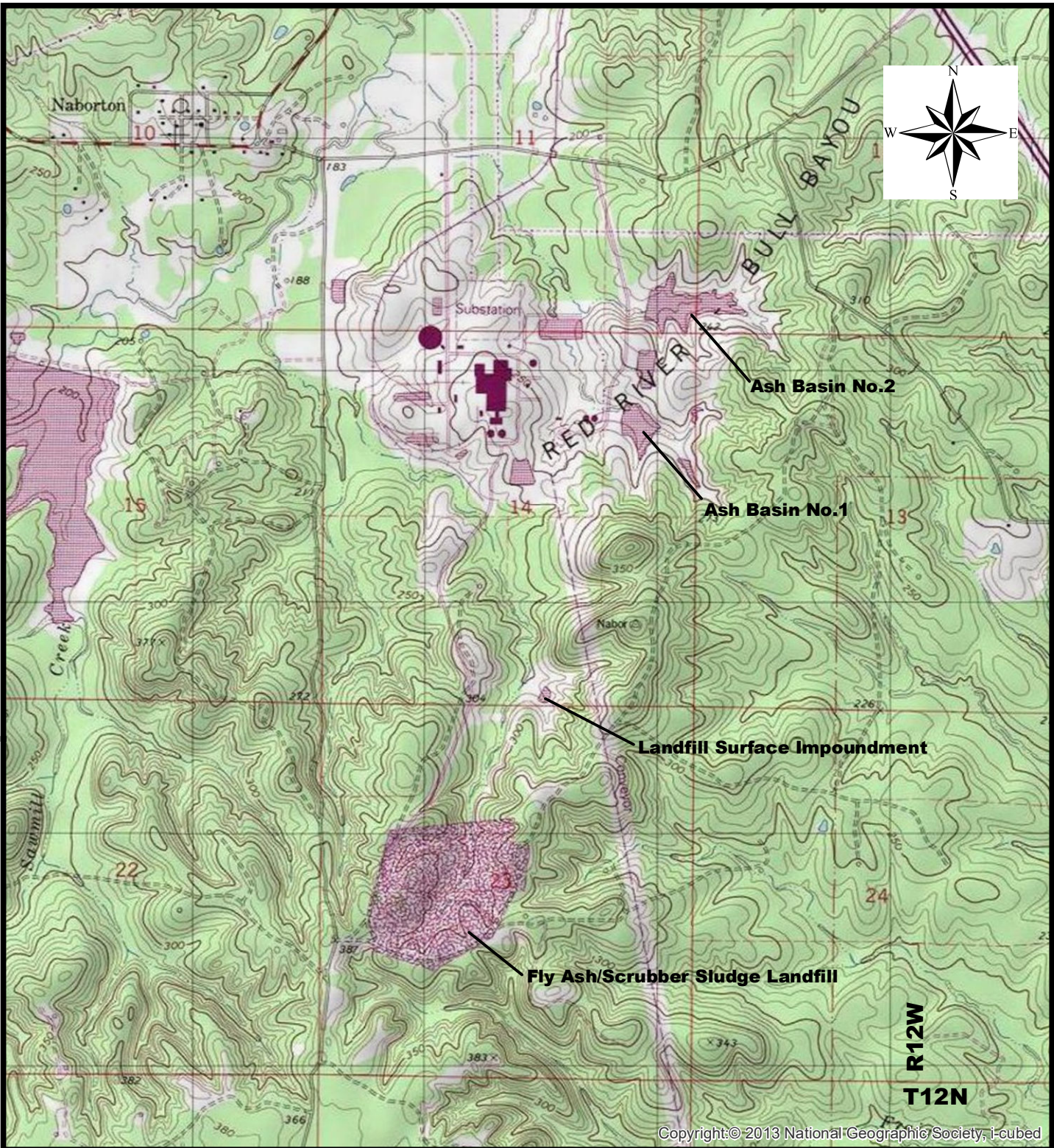
- Cleco DHPS has a monitoring well system to monitor groundwater quality at Ash Basins No. 1 and No. 2 per applicable portions of §257.91. The network consists of five upgradient and seven downgradient monitoring wells.
- Cleco conducted sufficient detection monitoring sampling events, per applicable portions of §257.93 and §257.94.
- Potentiometric surface evaluation at the Ash Basins indicates consistent groundwater flow to the west.
- Statistical evaluations of data conducted per applicable portions of §257.93 indicate that no confirmed SSIs have been generated in downgradient wells.
- Semi-annual detection monitoring sampling events are tentatively scheduled for March and September of 2024. Data generated during these sampling events will be included in the next annual report.

8.0 CERTIFICATION

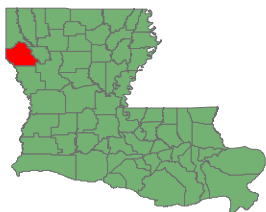
I hereby certify this annual groundwater monitoring report for Cleco Power LLC. I am a duly licensed Professional Engineer under the laws of the State of Louisiana.



<u>Signature</u>	<u>27124</u>
<u>Bradley E. Bates</u>	<u>Professional Engineer</u>
<u>Name</u>	<u>Title</u>
<u>Eagle Environmental Services, Inc.</u>	<u>12/21/2023</u>
<u>Company</u>	<u>Date</u>



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Note:
 U.S.G.S. Quadrangle "Bayou Pierre Lake, LA" at scale 1:24,000

CLECO Power LLC
 Dolet Hills Power Station

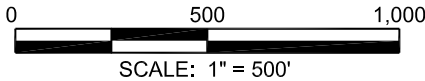
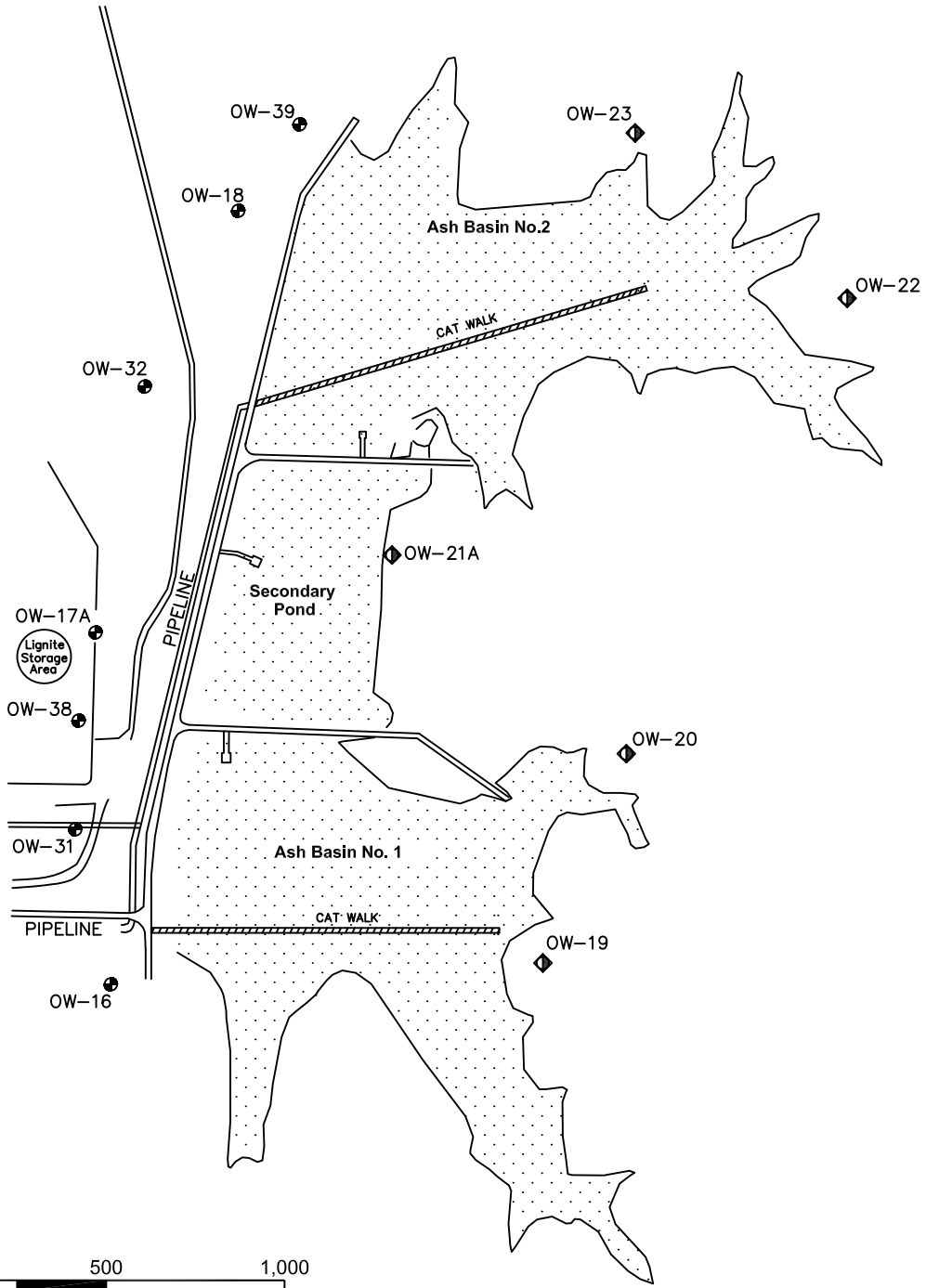
Site Location Map

DeSoto Parish, Louisiana






Drawn:	JP
Checked:	RS
Approved:	JM
Date:	3/23/17
Dwg. No.:	01-22-0168-C001

FIGURE 1



Legend

-  OW-16 Zone 4 Compliance Monitoring Well Location
-  OW-23 Zone 4 Background Monitoring Well Location
-  Permitted Facility



Dolet Hills Power Station

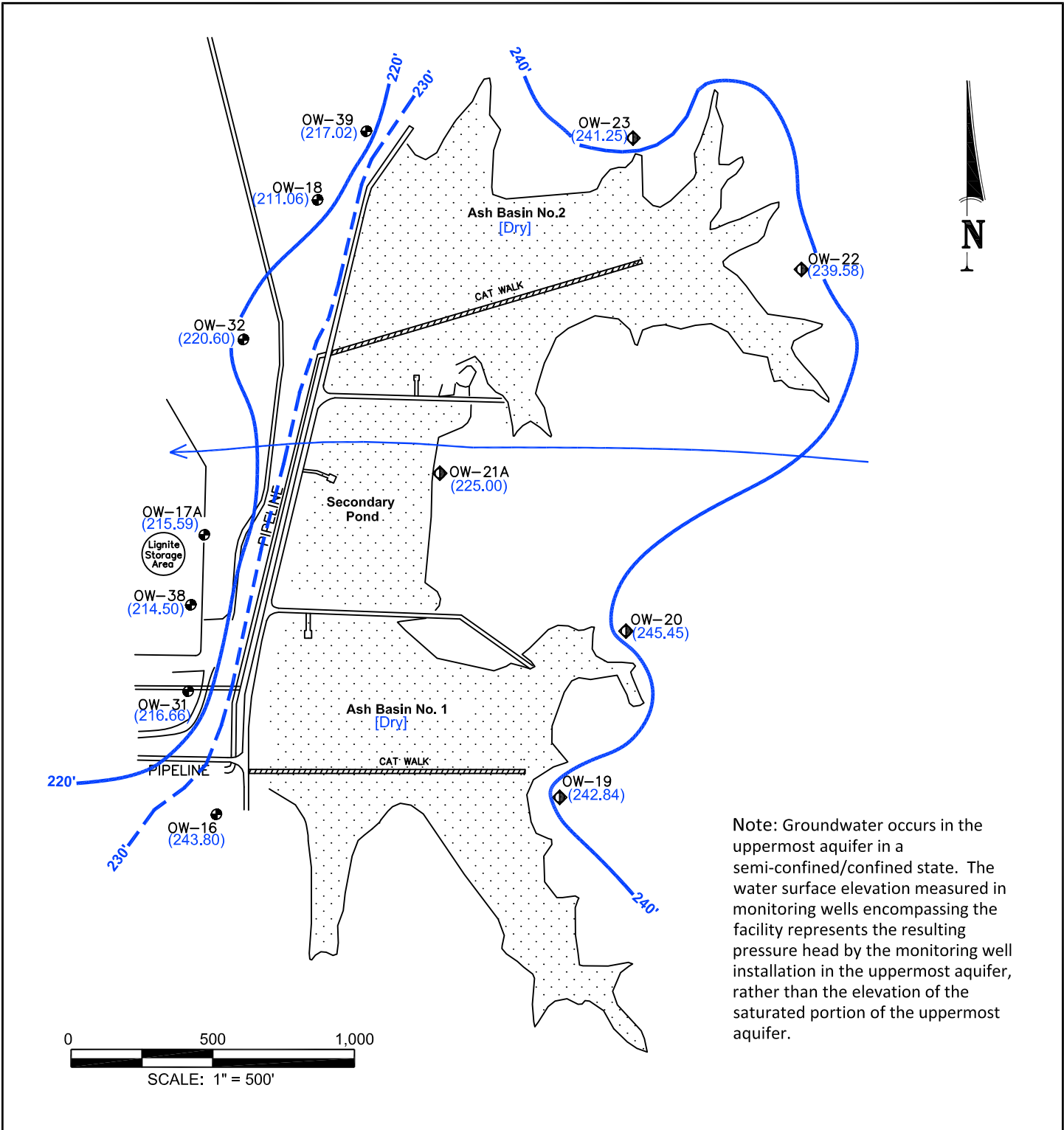
Zone 4 Monitoring Wells Location Map

DeSoto Parish, Louisiana

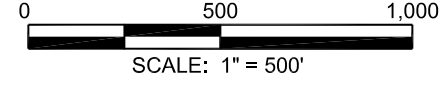


Drawn:	JP
Checked:	JM
Approved:	JM
Date:	10/5/22
Dwg. No.:	01-22-0168-C002

Figure 2




Note: Groundwater occurs in the uppermost aquifer in a semi-confined/confined state. The water surface elevation measured in monitoring wells encompassing the facility represents the resulting pressure head by the monitoring well installation in the uppermost aquifer, rather than the elevation of the saturated portion of the uppermost aquifer.



Legend

- OW-16 Zone 4 Compliance Monitoring Well Location
- OW-23 Zone 4 Background Monitoring Well Location
- Permitted Facility
- (242.84) Potentiometric Surface Elevation (ft. NGVD)
- [Dry] Surface Water Elevation (ft. NGVD)
- 240' — Potentiometric Surface Elevation Contour Line (ft. NGVD)
- Inferred Groundwater Flow Direction



Dolet Hills Power Station

Potentiometric Surface Map

March 2023

DeSoto Parish, Louisiana


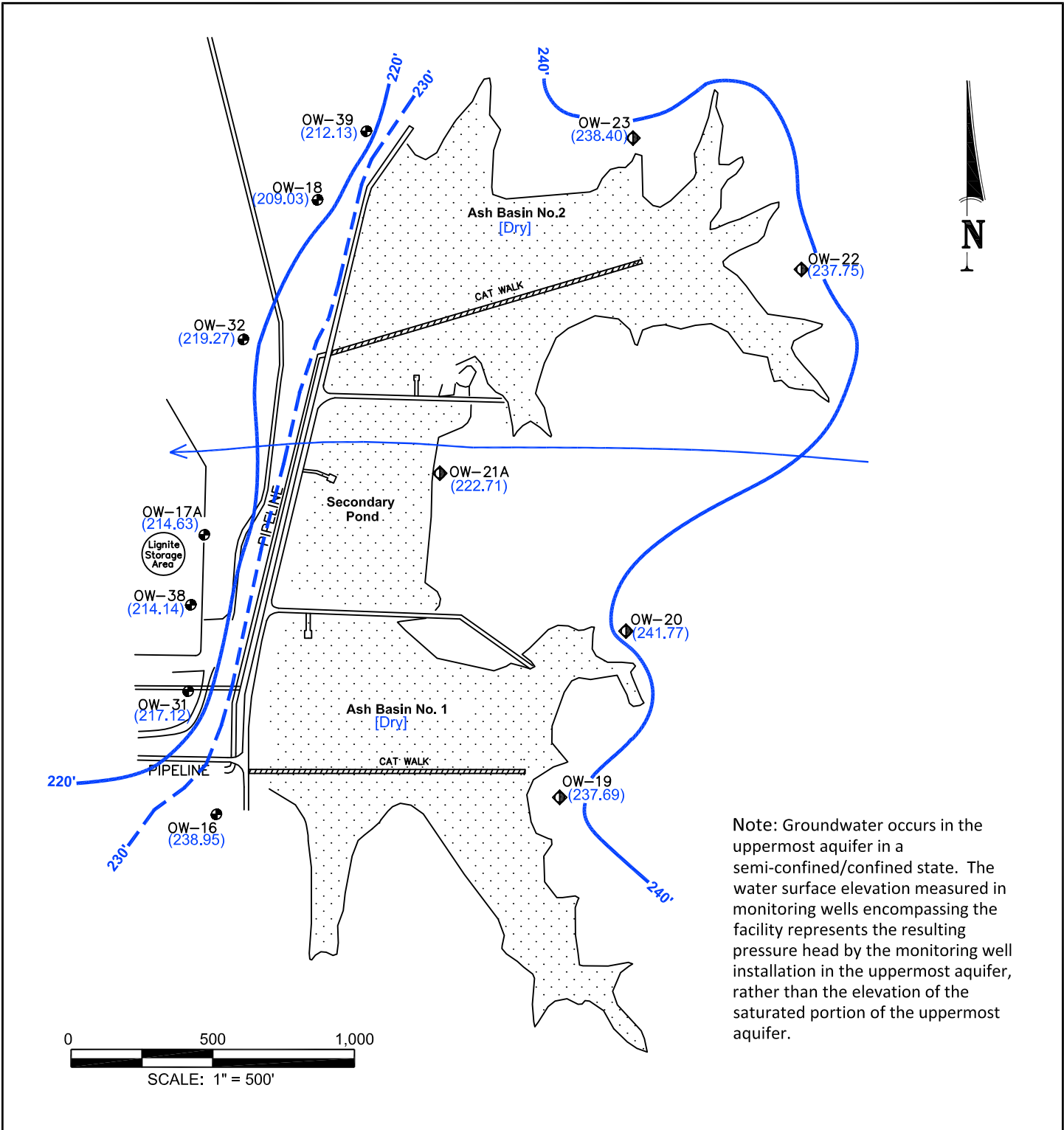
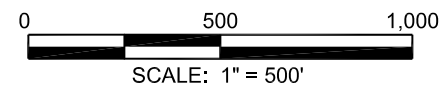
	Drawn: JP
	Checked: JM
	Approved: JM
	Date: 5/3/23
	Dwg. No.: 01-23-0168-A001

Figure 3



Note: Groundwater occurs in the uppermost aquifer in a semi-confined/confined state. The water surface elevation measured in monitoring wells encompassing the facility represents the resulting pressure head by the monitoring well installation in the uppermost aquifer, rather than the elevation of the saturated portion of the uppermost aquifer.



Legend

- OW-16 Zone 4 Compliance Monitoring Well Location
- ◆ OW-23 Zone 4 Background Monitoring Well Location
- ▨ Permitted Facility
- (241.77) Potentiometric Surface Elevation (ft. NGVD)
- [Dry] Surface Water Elevation (ft. NGVD)
- 240' — Potentiometric Surface Elevation Contour Line (ft. NGVD)
- ← Inferred Groundwater Flow Direction



 Dolet Hills Power Station											
Potentiometric Surface Map September 2023											
DeSoto Parish, Louisiana											
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Figure 4											



Table 1
Monitoring Well Information

Cleco Dolet Hills Power Station
Ash Basins

Well Number	OW-16	OW-17A	OW-18	OW-19	OW-20	OW-21A
Up or Down Gradient	D	D	D	U	U	U
Ash Basin Unit Monitored	AB No. 1	AB No. 1	AB No. 2	Both	Both	Both
Latitude (dd°mm'ss")	32°03'26"	32°03'36"	32°03'47"	32°03'26"	32°01'52"	32°01'56"
Longitude (dd°mm'ss")	93°31'52"	93°31'53"	93°31'49"	93°31'52"	93°33'31"	93°33'41"
Casing Elevation (ft NGVD)	254.95	231.57	218.44	260.01	258.84	244.40
Well Depth (ft bgs)	42.0	45.3	31.5	34.1	31.8	31.9
Screen Length (ft)	10	10	10	10	10	10
Top of Screen (ft NGVD)	217.97	194.13	194.17	230.98	234.39	219.93
Bottom of Screen (ft NGVD)	207.97	184.13	184.17	220.98	224.39	209.93
Casing Diameter & Material	4" PVC	4" PVC	4" PVC	4" PVC	4" PVC	4" PVC

Well Number	OW-22	OW-23	OW-31	OW-32	OW-38	OW-39
Up or Down Gradient	U	U	D	D	D	D
Ash Basin Unit Monitored	Both	Both	AB No. 1	AB No. 2	AB No. 1	AB No. 2
Latitude (dd°mm'ss")	32°02'07"	32°02'10"	32°01'51"	32°02'05"	32°01'55"	32°02'10"
Longitude (dd°mm'ss")	93°33'22"	93°33'31"	93°33'51"	93°33'48"	93°33'50"	93°33'44"
Casing Elevation (ft NGVD)	256.98	255.55	221.71	237.65	221.60	228.96
Well Depth (ft bgs)	31.1	38.4	29.5	30.0	37.3	32.5
Screen Length (ft)	10	10	10	10	10	10
Top of Screen (ft NGVD)	234.19	224.57	199.11	214.7	192.36	203.69
Bottom of Screen (ft NGVD)	224.19	214.57	189.11	204.7	182.36	193.69
Casing Diameter & Material	4" PVC	4" PVC	2" PVC	2" PVC	2" PVC	2" PVC



Table 2
2023 Analytical Data Summary

Cleco Dolet Hills Power Station
Ash Basins

Parameter/Well/Date		Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS
OW-16	3/13/23	0.937	398	392	<1.25	6.88	2,160	3,890
	9/28/23	0.862	394	357	<1.25	6.93	1,800	3,860
OW-17A	3/13/23	2.14	64.5	851	<1.25	6.98	28.5	1,910
	9/28/23	2.01	73.8	805	<1.25	7.37	23.7	2,000
OW-18	3/13/23	0.197	10.3	38.2	<1.25	7.14	<10	308
	9/28/23	0.192	12.4	46.2 / 33.4**	<1.25	6.96	<10	392
OW-19 (BG)	3/14/23	0.28	7.41	33.4	<1.25	7.08	22.3	410
	9/28/23	0.417	8.22	50.2	<1.25	7.37	15.5	600
OW-20 (BG)	3/14/23	0.312	37.8	82.4	<1.25	6.79	162	558
	9/28/23	0.259	36.2	81.8	<1.25	7.24	134	600
OW-21A (BG)	3/14/23	0.422	340	554	<1.25	7.04	1,310	3,240
	9/28/23	0.43	392	560	<1.25	6.79	1,400	3,600
OW-22 (BG)	3/13/23	0.114	171	180	<1.25	7.62	613	1,450
	9/28/23	0.099	181	161	<1.25	7.08	573	1,570
OW-23 (BG)	3/13/23	1.55	227	494	<1.25	7.07	1,830	3,670
	9/28/23	1.4	264	494	<1.25	7.14	1,650	3,970
OW-31	3/13/23	3.13	83.3	1,360	<1.25	7.7	<10	2,480
	9/28/23	2.89	87.5	1,250	<1.25	7.44	<10	2,780
OW-32	3/13/23	1.96	500	508	<1.25	6.52	4,170	6,480
	9/28/23	1.62	523	473	<1.25	6.53	3,620	6,540
OW-38	3/13/23	1.92	19.3	164	<1.25	7.98	<10	662
	9/28/23	2.06	19.9	167	<1.25	7.62	<10	898
OW-39	3/13/23	1.01 / 0.78*	415	1,690	<1.25	6.89	2,890	7,240
	9/28/23	1.15 / 0.63**	405	1,540	<1.25	6.96	2,000	6,780

* 5/23/23 resampling result

** 10/25/23 resampling result

Notes:

pH in standard units

All other parameters in milligrams per liter