CLECO POWER LLC
DOLET HILLS POWER STATION

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

2022 Annual Groundwater Monitoring Report for the Coal Combustion Residuals Rule

January 2023

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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 2022 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 February and September 2022.

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)
February 2022	0.02 to 0.06	2.0E-08 to 4.2E-03
September 2022	0.02 to 0.05	2.0E-08 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 2022 detection monitoring groundwater data showed that no confirmed SSIs were generated in downgradient wells at the Ash Basins.

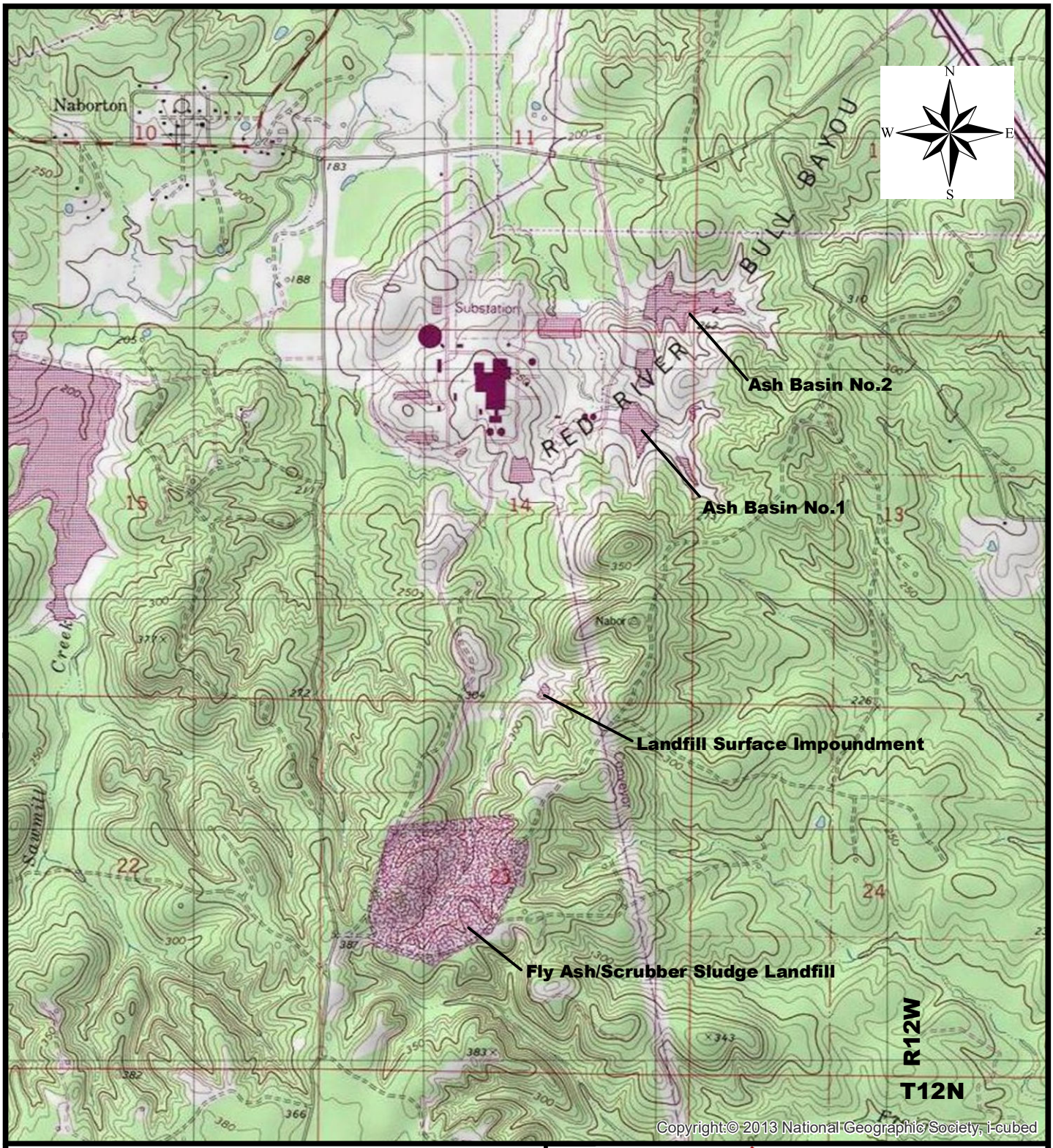
7.0 CONCLUSIONS AND RECOMMENDATIONS

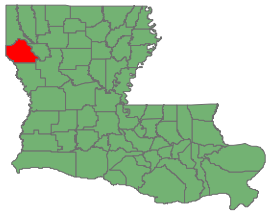
- Cleco DHPS has a monitoring well system to monitor groundwater quality at Ash Basins No. 1 and No. 2 per applicable portions of §257.91. The network consists of five upgradient and seven downgradient monitoring wells.
- Cleco conducted sufficient detection monitoring sampling events, per applicable 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 2023. 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.

	27124
Signature	**PE Registration Number**
Bradley E. Bates	*Professional Engineer*
Name	**Title**
Eagle Environmental Services, Inc.	*12/14/2022*
Company	**Date**





0 750 1,500 3,000 4,500 Feet

Note:

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

CLECO Power LLC

Dolet Hills Power Station

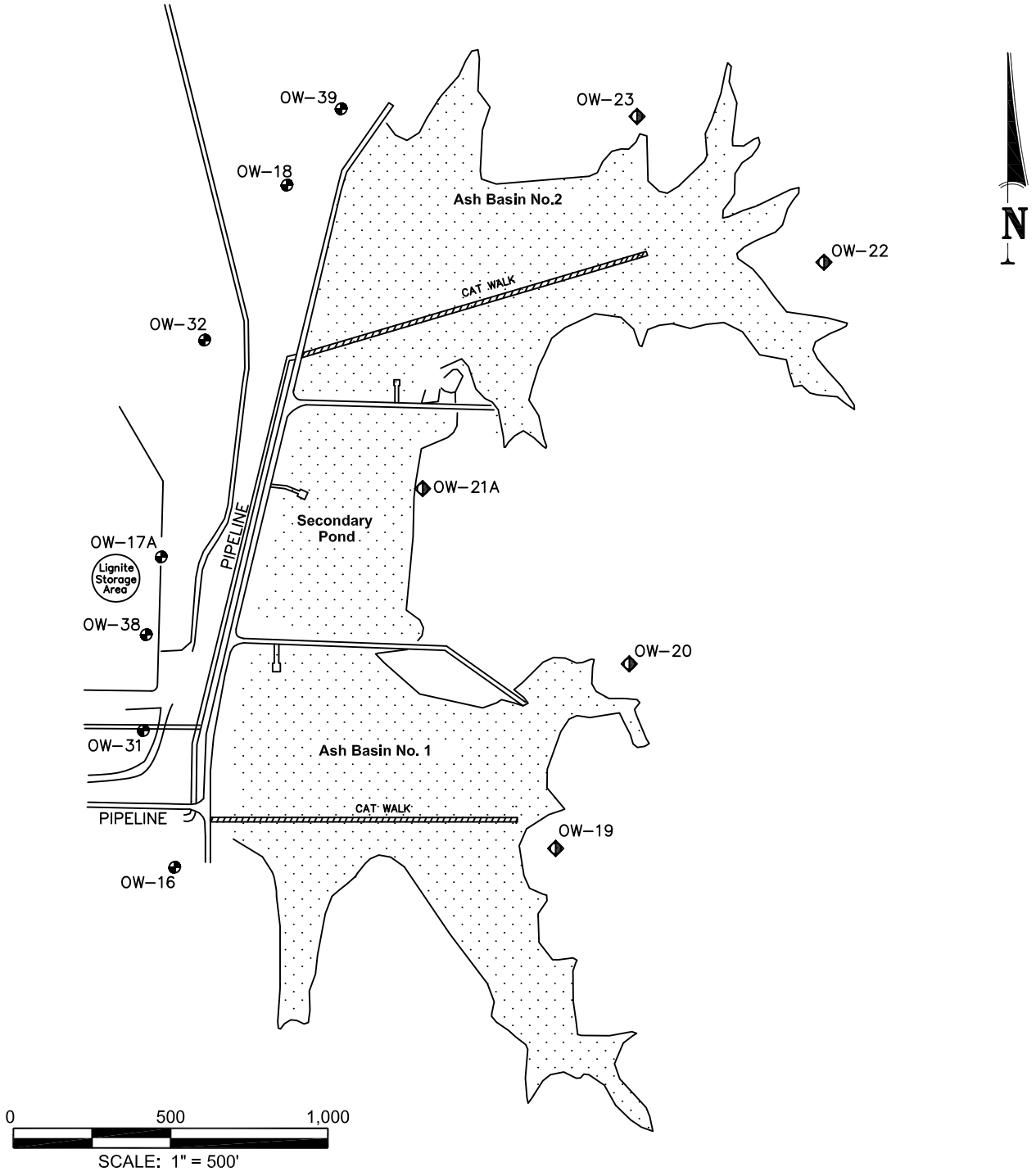
Site Location Map

DeSoto Parish, Louisiana

E·A·G·L·E ENVIRONMENTAL SERVICES, INC.

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

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Dolet Hills Power Station

Zone 4 Monitoring Wells Location Map

DeSoto Parish, Louisiana

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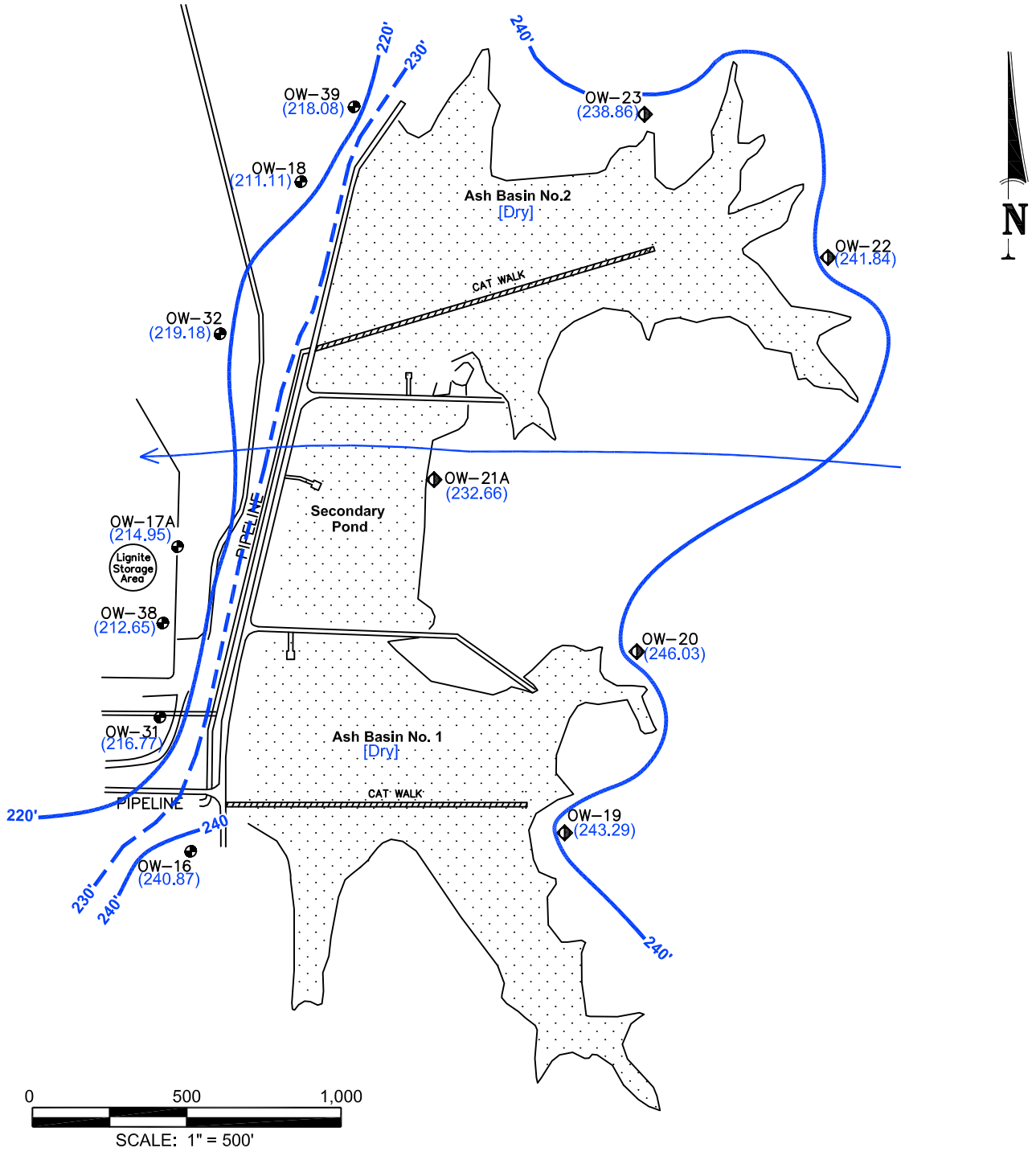
Dwg. No.:	01-22-0168-C002

Figure 2



Legend

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

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Dolet Hills Power Station

Potentiometric Surface Map
February 2022

DeSoto Parish, Louisiana

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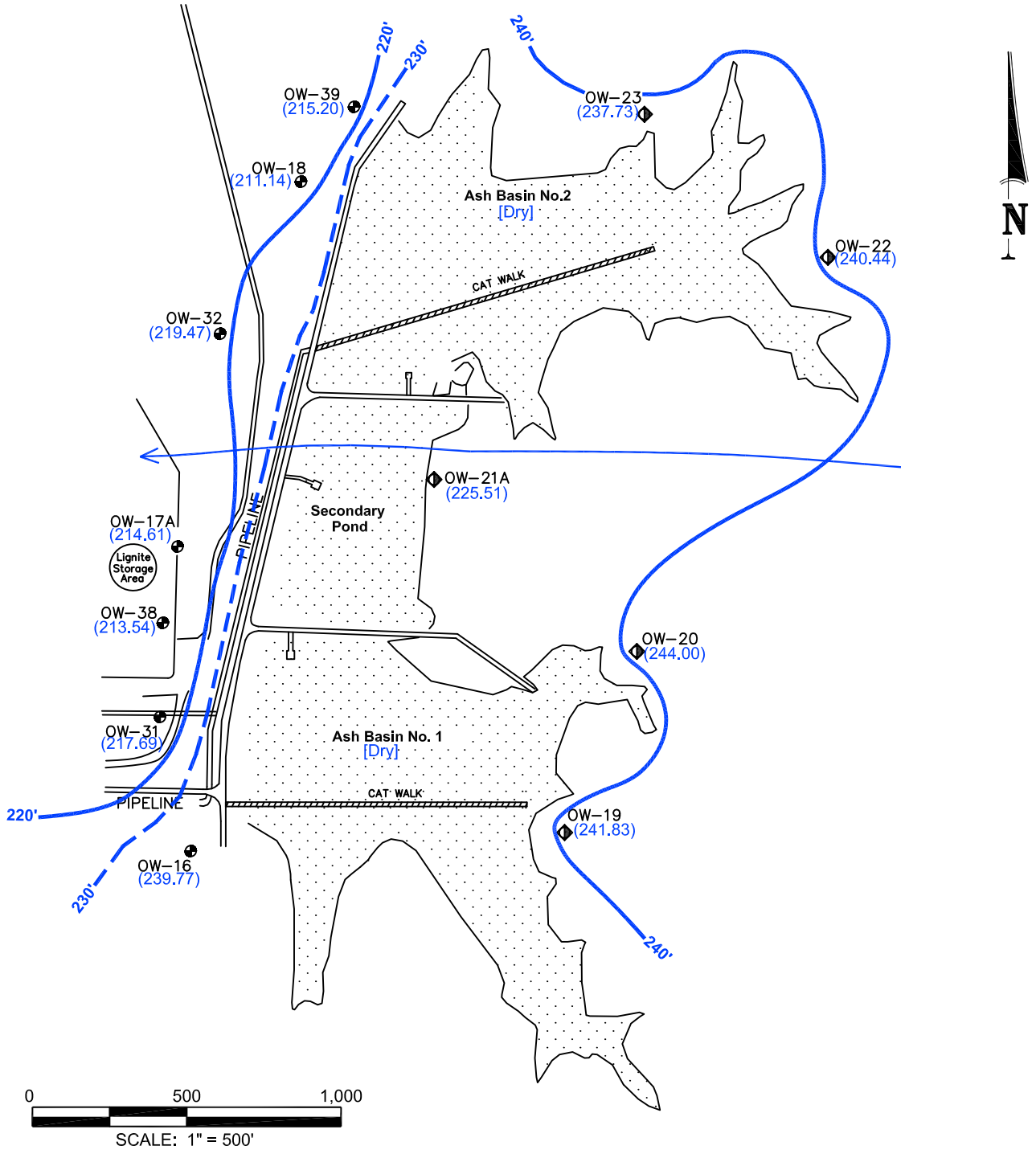
Approved:	JM
Date:	10/5/22
Dwg. No.:	01-22-0168-A001

Figure 3



Legend

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

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Dolet Hills Power Station

Potentiometric Surface Map
September 2022

DeSoto Parish, Louisiana

E·A·G·L·E ENVIRONMENTAL SERVICES, INC.

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Date:	10/5/22
Dwg. No.:	01-22-0168-B001

Figure 4

Table 1
Monitoring Well Information

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
2022 Analytical Data Summary

Cleco Dolet Hills Power Station
Ash Basins

Parameter/Well/Date		Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS
OW-16	2/15/22	0.986	481	324	<12.5	6.58	2,330	4,680
	9/12/22	0.933	477	404	0.226	6.74	2,610	4,530
OW-17A	2/15/22	2.16	76.7	836	<1.25	7.27	31.7	1,980
	9/12/22	1.84	65.4	869	0.132	7.1	31	1,900
OW-18	2/15/22	0.184	9.61	40.6	0.384	7.49	2.03	344
	9/12/22	0.168	11.7	45.2 / 38.9**	0.372	7.19	<1	264
OW-19 (BG)	2/16/22	0.317	10.1	57.2	0.33	7.01	24.1	456
	9/12/22	1.05	15.7	133	0.269	7.15	<1	832
OW-20 (BG)	2/16/22	0.281	41.5	84	0.351	6.94	148	562
	9/12/22	0.265	37.5	84.9	0.326	7	129	522
OW-21A (BG)	2/16/22	0.337	329	497	<1.25	6.34	1,110	3,040
	9/12/22	0.355	311	484	0.14	6.64	1,170	3,230
OW-22 (BG)	2/16/22	0.103	177	180	<1.25	7.68	554	1,520
	9/12/22	0.11	194	180	0.179	7.43	657	1,540
OW-23 (BG)	2/16/22	1.5	239	366	<12.5	6.97	1,400	3,780
	9/12/22	1.4	232	523	0.141	7.06	1,730	3,690
OW-31	2/15/22	3.12	90.5	1,300	<12.5	7.87	<100	2,830
	9/12/22	2.95	85.6	1,310	0.158	7.59	<1	2,610
OW-32	2/15/22	1.91	490	492	<12.5	6.75	3,760	6,710
	9/12/22	1.77	495	556	<1.25	6.68	3,250	6,610
OW-38	2/15/22	2.29	20.2	185	0.524	7.89	<1	770
	9/12/22	2.11	19.8	196	<1.25	7.68	<10	766
OW-39	2/15/22	0.881 / 0.807*	491	1,680	<0.125	6.65	3,020	8,030
	9/12/22	0.88	436	1,930	<1.25	6.8	2,750	7,820

*4/28/22 resampling result
** 10/24/22 resampling result

Notes:
pH in standard units
All other parameters in milligrams per liter