CLECO POWER LLC
DOLET HILLS POWER STATION

FLY ASH/SCRUBBER SLUDGE LANDFILL
MANSFIELD, LA

2024 Annual Groundwater Monitoring Report for the Coal Combustion Residuals Rule

January 2025

TABLE OF CONTENTS

Figures

Tables

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 2024 Annual Groundwater Monitoring report for the Fly Ash/Scrubber Sludge Landfill 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 landfill in service at the plant has been permitted to operate by the Louisiana Department of Environmental Quality (LDEQ) Waste Permits Division. The materials deposited in this facility 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 landfill. The monitoring system consists of monitoring wells installed previously to conduct groundwater monitoring required by DHPS's LDEQ approved solid waste permit. A total of eight monitoring wells have been installed per applicable portions of §257.91. The uppermost water bearing zone that is laterally continuous beneath the landfill is referred to as Zone 3. 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 2024.

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 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 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

Potentiometric surface maps were prepared to evaluate groundwater flow in Zone 3 (**Figures 3 and 4**). The potentiometric surface maps prepared for Zone 3 indicate that groundwater in Zone 3 flows to the north, converging toward the stream and mimicking the topography of the site. Based on soil borings completed for solid waste permitting activities for Cleco's surge ponds and other surface impoundments to the north, Zone 3 is not laterally continuous in areas north of the landfill and its surface impoundment. Field mapping and observations at the facilities have identified that groundwater drains to land surface in outcrop areas of Zone 3 and is directed to the stream in the base of the valley. Elevations of the stream bed have been incorporated into the potentiometric surface maps for Zone 3. These elevations were obtained from a detailed site topographic survey of the Fly Ash/Scrubber Sludge Landfill, dated April 3, 1995. 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, $v = [k(dh/dl)] / ne$. 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 ne is effective porosity (unitless).

For Zone 3, hydraulic conductivity (k) values ranging from 0.1 to 10 ft/day were assumed based on the silty very fine- to fine-grained sand observed in soil cuttings from soil borings completed at the facility (Heath, 1989). Hydraulic gradient (dh/dl) values are listed below based on potentiometric surface maps completed for Zone 3. An effective porosity (ne) of 0.2 was assumed based on the soil types of Zone 3 (Fetter, 1980). Using these values, the groundwater flow rates (v) are listed below**.**

Date	Hydraulic Gradient (feet/feet)	Estimated Groundwater Flow Velocity (feet/day)
March 2024	0.04 to 0.1	0.02 to 5
September 2024	0.04 to 0.1	0.02 to 5

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 landfill 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 wells at the landfill. Analytical results are provided in **Table 2**.

The depths below ground surface of the monitored water bearing zone at the landfill should be noted. Due to extreme topography at the landfill site, the total depths of background wells range from approximately 110 to 160 feet below ground surface (ft bgs). The compliance wells at the landfill have total depths ranging from approximately 15 to 40 ft bgs. The monitored zone downgradient of the landfill has frequently produced wells with poor groundwater yield.

During all CCR Rule sampling events from 2016-20, downgradient well MW-9A failed to produce sufficient groundwater yield for purging and sampling activities. MW-9A was installed to monitor groundwater quality downgradient of the landfill as part of a LDEQ solid waste permit renewal project in 2010. The location and monitoring well construction details were approved by geologists in the LDEQ Waste Permits Division. MW-9A produced sufficient groundwater yield during LDEQ sampling events conducted from 2010-14. Afterwards, MW-9A only produced sufficient groundwater yield during the September 2015 LDEQ sampling event, which was the last sampling event conducted before the commencement of CCR sampling activities. MW-9A then produced sufficient groundwater to be sampled during the March 2021 sampling event. Quarterly sampling of MW-9A was conducted in 2021 and 2022 to establish baseline conditions. Statistical analysis is now conducted for MW-9A, as with the other downgradient wells. Cleco will continue to monitor groundwater availability in MW-9A in future sampling events.

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 landfill.

Prediction limits are used to conduct statistical evaluations at the Fly Ash/Scrubber Sludge Landfill. 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.

Statistical evaluation for fluoride at the landfill was performed using an interwell prediction limit. The prediction limit was constructed from the upgradient well data and based on the distribution of that data. The most recent result for each downgradient well for fluoride was compared to the prediction limit.

Interwell statistical analysis of the 2024 detection monitoring groundwater data showed that no SSIs were generated in downgradient wells at the landfill.

Due to statistically significant variation found in upgradient monitoring well data, all detection monitoring parameters except fluoride 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.

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 facility, only downgradient wells are subject to verification resampling.

Intrawell statistical analysis of the 2024 detection monitoring groundwater data showed that no SSIs were generated in downgradient wells at the landfill.

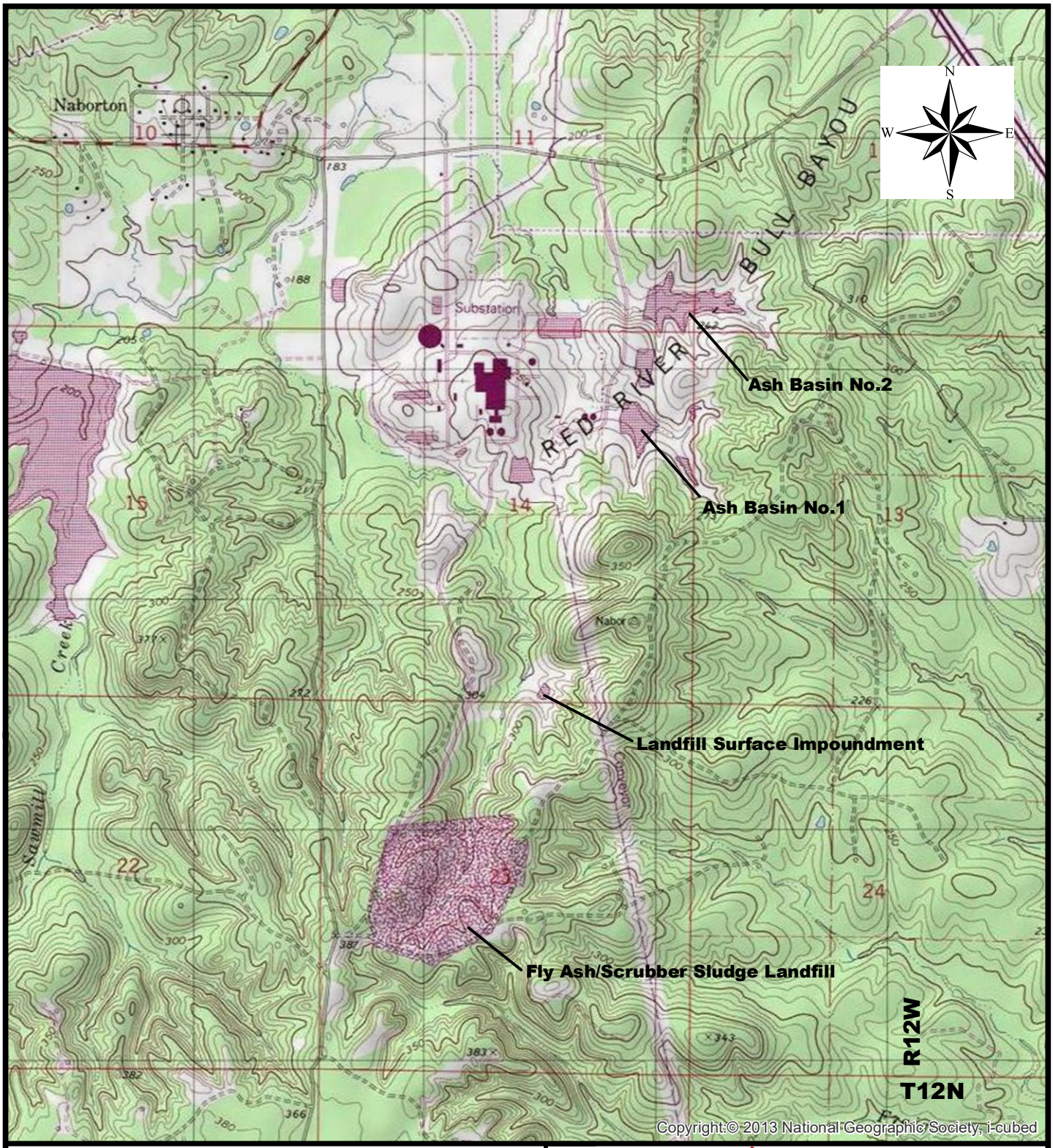
7.0 CONCLUSIONS AND RECOMMENDATIONS

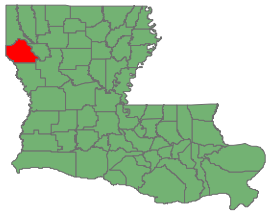
- Cleco DHPS has a monitoring well system to monitor groundwater quality at the Fly Ash/Scrubber Sludge Landfill per applicable portions of §257.91. The network consists of five upgradient and three downgradient monitoring wells.
- Cleco conducted sufficient detection monitoring sampling events, per applicable portions of §257.93 and §257.94.
- Potentiometric surface evaluation at the landfill indicates consistent groundwater flow into the valley towards the intermittent stream at the facility.
- Statistical evaluations of data conducted per applicable portions of §257.93 indicate that no SSIs have been generated in downgradient wells.
- Semi-annual detection monitoring sampling events are tentatively scheduled for March and September of 2025. 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.	*12/23/2024*
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

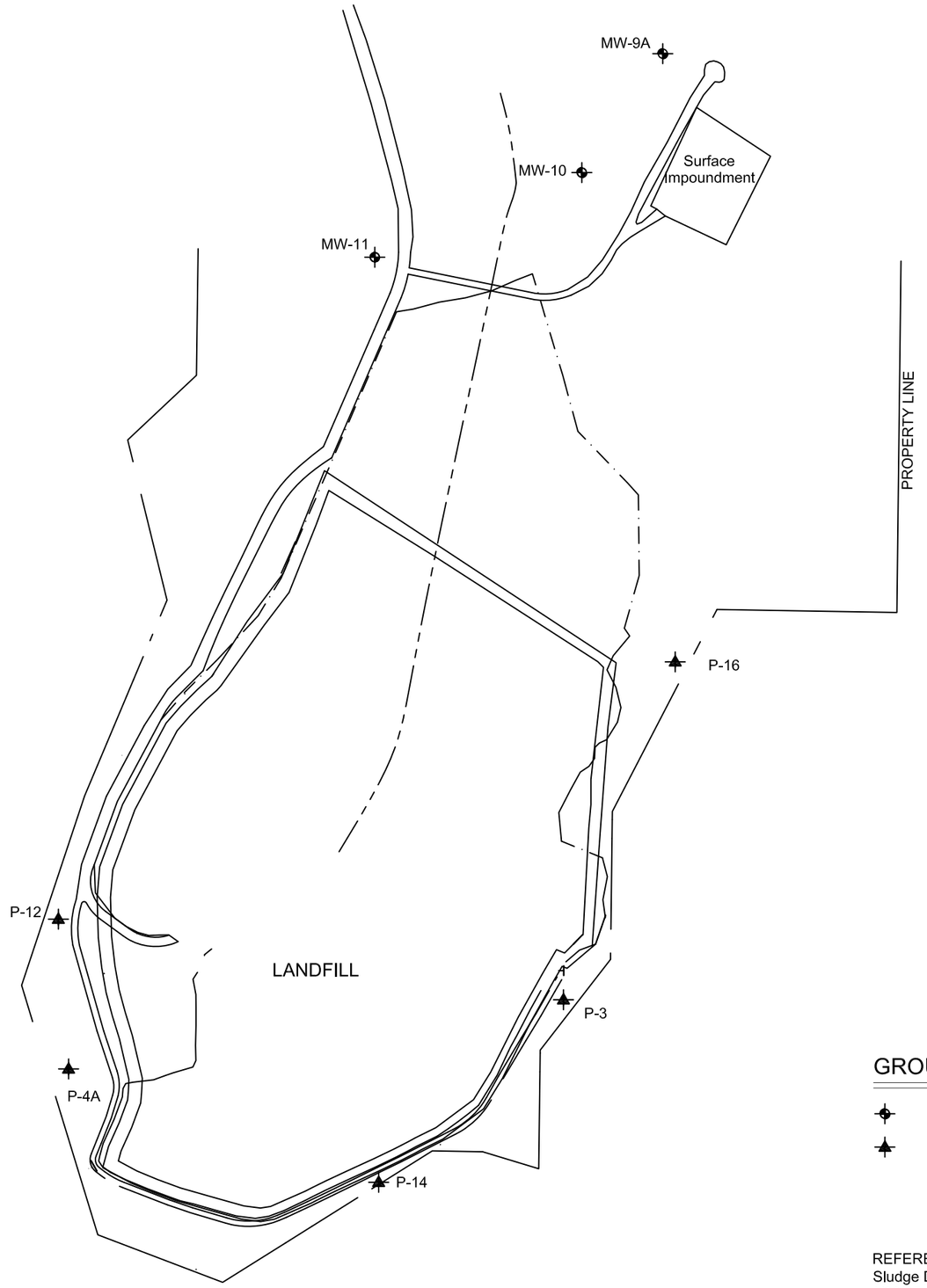
Site Location Map

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



N

Legend

- EXISTING MONITORING WELLS
- LIMITS OF FUTURE DEVELOPMENT

500 0 500

Scale: 1" = 500'

GROUNDWATER MONITORING SYSTEM - ZONE 3

DOWNGRADIENT / DETECTION	MW-9A, MW-10, MW-11
UPGRADIENT / BACKROUND	P-3, P-4A, P-12, P-14, P-16

REFERENCE:
Sludge Disposal Landfill Map by Alliance, Inc., dated 1/20/95. Updated 2013.

CLECO Power LLC

Dolet Hills Power Station

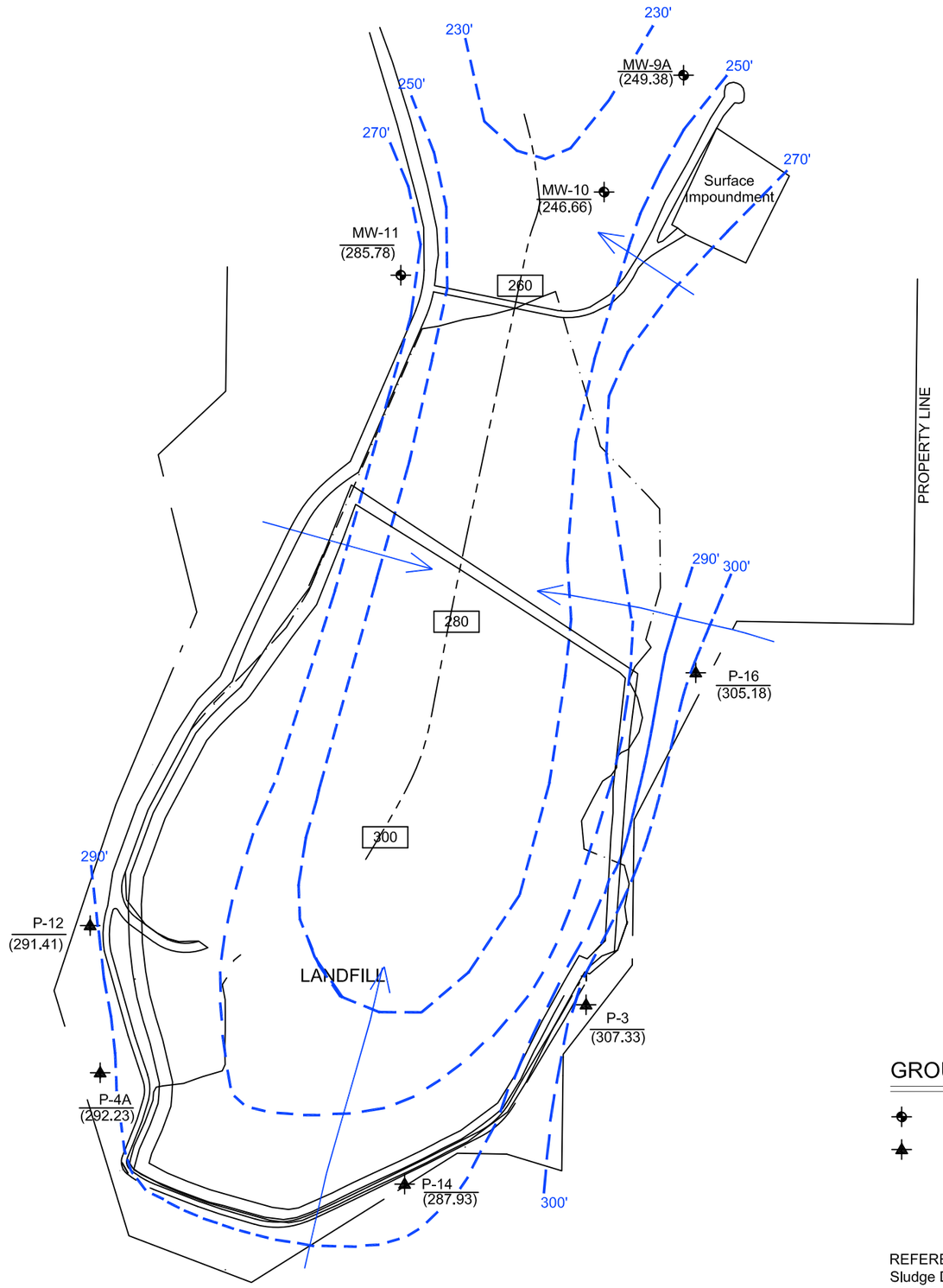
Monitoring Well Location Map

De Soto Parish, Louisiana

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

Drawn:	JP
Checked:	ON
Approved:	JM
Date:	3/6/17
Dwg. No.:	01-17-0168-A005

Figure 2



Legend

- EXISTING MONITORING WELLS
- LIMITS OF FUTURE DEVELOPMENT
- (307.33) POTENTIOMETRIC SURFACE ELEVATION (FEET)
- 270' POTENTIOMETRIC SURFACE CONTOUR (FEET)
- INFERRED GROUNDWATER FLOW DIRECTION
- INTERMITTENT STREAM
- 260 280 300 INTERMITTENT STREAM ELEVATIONS (Values taken from historical data)

N

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.

500 0 500

Scale: 1" = 500'

GROUNDWATER MONITORING SYSTEM - ZONE 3

⊕	DOWNGRADIENT / DETECTION	MW-9A, MW-10, MW-11
▲	UPGRADIENT / BACKROUND	P-3, P-4A, P-12, P-14, P-16

REFERENCE:
Sludge Disposal Landfill Map by Alliance, Inc., dated 1/20/95. Updated 2013.

CLECO Power LLC

Dolet Hills Power Station

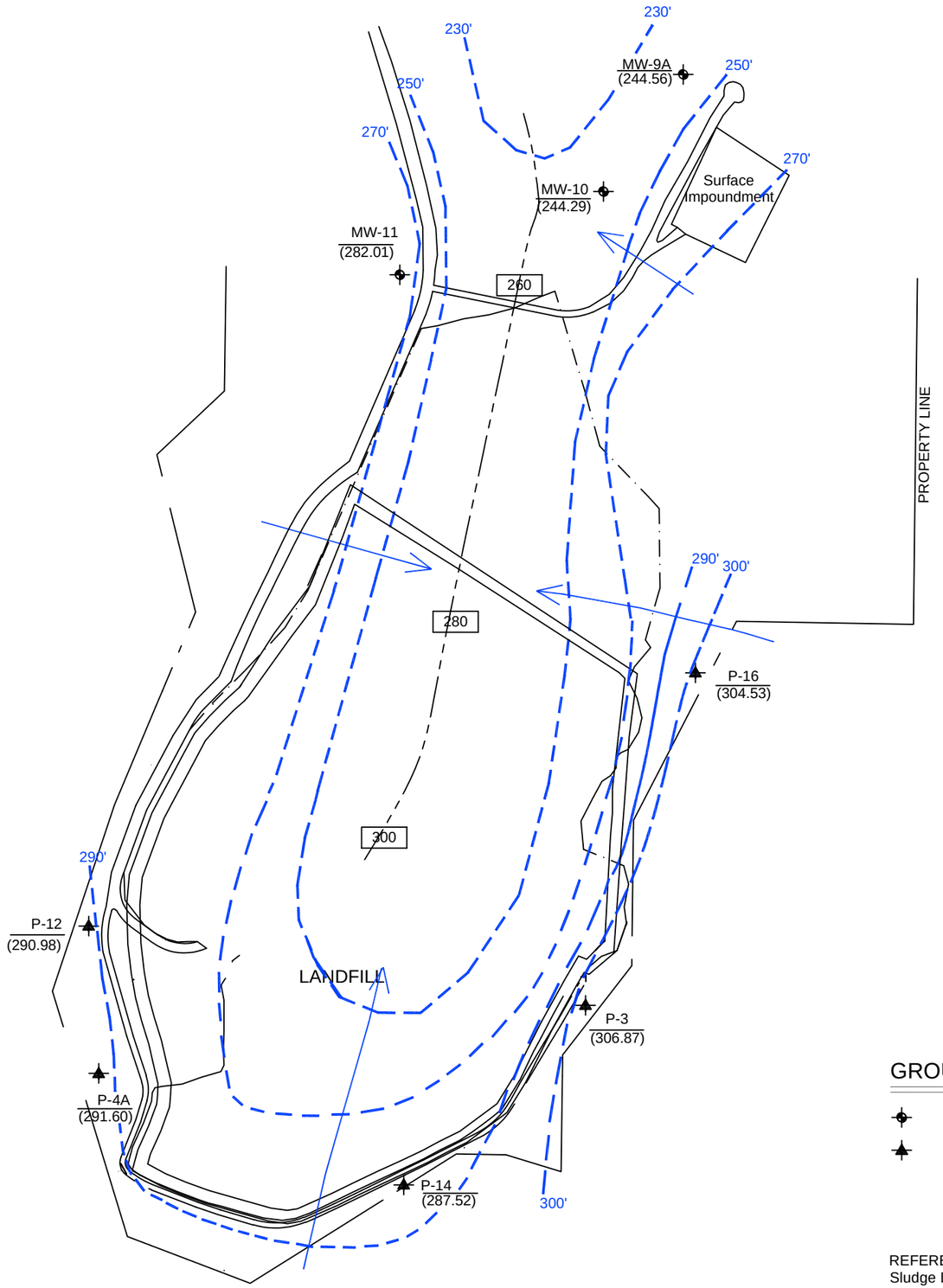
Fly Ash / Scrubber Sludge Landfill Zone 3 Potentiometric Surface Map March 2024

De Soto Parish, Louisiana

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

Drawn:	JP
Checked:	JM
Approved:	JM
Date:	5/1/24
Dwg. No.:	01-24-0264-B001

Figure 3



Legend

- EXISTING MONITORING WELLS
- LIMITS OF FUTURE DEVELOPMENT
- (306.87) POTENTIOMETRIC SURFACE ELEVATION (FEET)
- 270' POTENTIOMETRIC SURFACE CONTOUR (FEET)
- INFERRED GROUNDWATER FLOW DIRECTION
- INTERMITTENT STREAM
- 260 280 300 INTERMITTENT STREAM ELEVATIONS (Values taken from historical data)

N

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.

500 0 500

Scale: 1" = 500'

GROUNDWATER MONITORING SYSTEM - ZONE 3

⊕	DOWNGRADIENT / DETECTION	MW-9A, MW-10, MW-11
▲	UPGRADIENT / BACKROUND	P-3, P-4A, P-12, P-14, P-16

REFERENCE:
Sludge Disposal Landfill Map by Alliance, Inc., dated 1/20/95. Updated 2013.

CLECO Power LLC

Dolet Hills Power Station

Fly Ash / Scrubber Sludge Landfill Zone 3 Potentiometric Surface Map September 2024

De Soto Parish, Louisiana

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

Drawn:	JP
Checked:	JM
Approved:	JM
Date:	10/1/24
Dwg. No.:	01-24-0264-B002

Figure 4

Table 1
Monitoring Well Information

Cleco Dolet Hills Power Station
Fly Ash/Scrubber Sludge Landfill

Well Number	P-3	P-4A	P-12	P-14	P-16	MW-9A	MW-10	MW-11
Gradient Position	Up	Up	Up	Up	Up	Down	Down	Down
Date Installed	Aug 1996	Nov 2012	Jul 1997	Jul 1997	Jun 1997	May 2010	May 2010	May 2010
Latitude (dd°mm'ss")	32°00'43.1"	32°00'41.1"	32°00'46.0"	32°00'36.3"	32°00'55.7"	32°01'18.5"	32°01'13.9"	32°01'10.7"
Longitude (dd°mm'ss")	93°34'05.3"	93°34'25.6"	93°34'27.4"	93°34'13.4"	93°34'00.5"	93°34'00.7"	93°34'04.7"	93°34'13.7"
Casing Elevation (ft NGVD)	361.68	382.00	378.45	367.16	371.07	254.98	252.80	301.73
Well Depth (ft bgs)	124	160	153	142	113	21.5	15.2	39.9
Screen Length (ft)	10	10	10	10	10	10	10	10
Top of Screen (ft NGVD)	247.7	229	235.2	235	269	240.3	244.5	268.2
Bottom of Screen (ft NGVD)	237.7	219	225.2	225	259	230.3	234.5	258.2
Casing Diameter & Material	2" PVC	2" PVC	2" PVC	2" PVC	2" PVC	2" PVC	2" PVC	2" PVC

Table 2
2024 Analytical Data Summary

Cleco Dolet Hills Power Station
Fly Ash/Scrubber Sludge Landfill

Parameter/Well/Date		Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS
P-3 (BG)	3/26/24	0.371	69.2	11.8	<1.25	8.49	<10	230
	9/4/24	0.119	36.6	<4	<1.25	8.25	<10	96
P-4A (BG)	3/26/24	0.988	19.3	8.62	<1.25	7.99	<10	330
	9/4/24	0.779	29.8	8.2	<1.25	7.52	<10	443
P-12 (BG)	3/27/24	1.2	57.4	24.4	<1.25	7.29	<10	480
	9/5/24	1.14	63.6	22.5	1.29	6.82	<10	540
P-14 (BG)	3/26/24	0.963	61.1	13.7	<1.25	8.79	<10	472
	9/4/24	0.882	49	10.9	<1.25	8.83	<10	603
P-16 (BG)	3/26/24	0.308	148	<4	<1.25	6.94	24	383
	9/4/24	0.261	134	<4	<1.25	6.99	32.9	363
MW-9A	3/27/24	0.584	326	548	2.39	6.01	3,180	5,920
	9/4/24	0.695	347	627	<1.25	7.01	4,000	6,030
MW-10	3/27/24	8.5	135	98.2	<1.25	6.73	796	1,330
	9/4/24	5.09	74.9	73.5	<1.25	6.47	605	1,310
MW-11	3/27/24	0.437	66.3	725	1.43	7	404	2,270
	9/4/24	0.418	65.2	795	1.92	6.92	476	2,430

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