

ROY S. NELSON PLANT

2024 Annual Groundwater Monitoring and Corrective Action Report

**PREPARED IN COMPLIANCE WITH THE
EPA FINAL RULE FOR THE DISPOSAL OF
COAL COMBUSTION RESIDUALS
TITLE 40 CODE OF FEDERAL REGULATIONS PART 257**



January 2025

**CCR UNIT
WESTLAKE, LA**

**2024 ANNUAL GROUNDWATER MONITORING
AND CORRECTIVE ACTION REPORT**

**Prepared for
Entergy Services, LLC
639 Loyola Ave.
Mail unit L-ENT 3D
New Orleans, LA 70113**

**Prepared By:
Pivotal Engineering LLC, and
Eagle Environmental**

January 2025

TABLE OF CONTENTS

<u>Section</u>	<u>Page No.</u>
1.0 Executive Summary	1
2.0 Introduction.....	1
3.0 Groundwater Monitoring Well Network	2
4.0 Installed or Decommissioned Monitoring Wells During 2024.....	2
5.0 Groundwater Monitoring Data.....	2
6.0 Status Summary of the 2024 Groundwater Monitoring Program.....	2
7.0 Projected Activities for 2025	4

Appendices

- A Site Map and Groundwater Flow Direction Maps
- B Sampling Schedule and Analytical Data

1.0 EXECUTIVE SUMMARY

The Coal Ash Landfill (CCR Unit) was in operation throughout 2024. For the duration of the current annual reporting period (January 2024 through December 2024), the groundwater quality was monitored under a detection monitoring program. In line with historical trends at the site, statistically significant increases of calcium were detected in wells CCR- 5 and CCR-7. Entergy Louisiana LLC (Entergy) had previously performed alternate source demonstrations (ASD) demonstrating that the SSIs are the result of natural variation in the groundwater quality. In 2024, no corrective measures were initiated.

2.0 INTRODUCTION

Entergy Louisiana LLC (Entergy), operates a Coal Ash Landfill (CCR Unit) for the disposal of coal combustion residuals (CCR) at the Roy S. Nelson Plant located in Westlake, Louisiana, see Figure 1 in Appendix A. The CCR Unit receives CCR generated from the combustion of coal at the Nelson Plant. Management of the CCR at the CCR Unit is performed pursuant to national criteria established in Title 40 of the Code of Federal Regulations (40 CFR) Part 257 (CCR Rule), published by the United States Environmental Protection Agency (EPA) on April 17, 2015. Entergy has installed a groundwater monitoring system at the CCR Unit that is subject to the groundwater monitoring and corrective action requirements provided under §§257.90 through 257.98 of the CCR Rule. In accordance with §257.90(e) of the CCR Rule, Entergy must prepare an annual report that provides information regarding the groundwater monitoring and corrective action program at the CCR Unit. The first groundwater monitoring report was completed in January 2018. This document is intended to provide the required information for the year 2024. In accordance with 257.90 (e) (6), the following overview is provided.

This report is the eighth annual groundwater monitoring report required under the CCR Rule and is the summary and analysis of results from the monitoring period starting January 1, 2024 and ending December 31, 2024. The CCR Unit was in detection monitoring at the beginning and end of the monitoring period.

A statistically significant increase (SSI) was detected for calcium in June 2024 in well CCR-08 and in December 2024 for wells CCR-05 and CCR-07. The SSI in June 2024 at well CCR-8 appears to be a laboratory error as the calcium SSIs have historically occurred at wells CCR-05 and CCR-07. The next sampling of CCR-08 resulted in the well being in compliance and in the normal range for the well. During the December 2024 sampling of CCR-08, it showed an SSI for low pH. CCR would typically result in a higher pH; thus, the well was resampled. During the resampling, the pH was recorded at a value of 6.42 (within the prediction limits).

With respect to CCR-05 and CCR-07, in Section 6.0, the prior ASDs demonstrated that the SSIs for calcium in wells CCR-5 and CCR-7 are the result of natural variation in groundwater quality and the basis for the prior ASDs remain applicable. Accordingly, an assessment monitoring program or corrective action remedy was not required to be initiated.

3.0 GROUNDWATER MONITORING WELL NETWORK

Entergy's groundwater monitoring system consists of 14 monitoring wells as shown in Appendix A see Figure 2. Pursuant to §257.91(f) of the CCR Rule, a qualified professional engineer has certified that the groundwater monitoring system has been designed and constructed to meet the requirements of this section of §257.91.

4.0 INSTALLED OR DECOMMISSIONED MONITORING WELLS DURING 2024

No monitoring wells were installed or decommissioned during 2024 at the CCR Unit.

5.0 GROUNDWATER MONITORING DATA

In accordance with §257.90(e)(3), all the monitoring data obtained under §§257.90 through 257.98 are provided in Appendix B along with a summary of the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was collected as part of detection or assessment monitoring.

6.0 STATUS SUMMARY OF THE 2024 GROUNDWATER MONITORING PROGRAM

Groundwater monitoring was performed in accordance with the detection monitoring requirements of §257.94. A summary of activities related to the 2024 groundwater detection monitoring performed is provided below:

- In accordance with §257.94(b), detection monitoring sampling was performed during March, June, September, and December 2024 for analysis of Appendix III parameters.
- Appendix IV parameters were collected in March, June, September and December 2024 to enhance the background data set for those constituents. Sample collection for Radium 226/228 was not performed as these constituents were not detected in any of the background data. As noted above, the March, June, September and December 2024 Appendix IV data were collected for background purposes and are not required by the rule since the unit is in detection monitoring.
- Statistical evaluation of the detection monitoring data was performed in accordance with the statistical method certified by a qualified Louisiana-registered Professional Engineer. The certified statistical method has been posted to Entergy's CCR Rule Compliance Data and Information website.
- In 2018, Entergy completed a successful alternate source demonstration (ASD) per §257.94(e)(2) in response to statistically significant increases (SSIs) identified for calcium in well CCR-7 during the second half of 2017 detection monitoring event. The ASD, which demonstrated that the SSI is the result of natural variation in groundwater quality, was certified by a Louisiana-registered professional engineer and was placed into the facility's operating record. Based on the successful

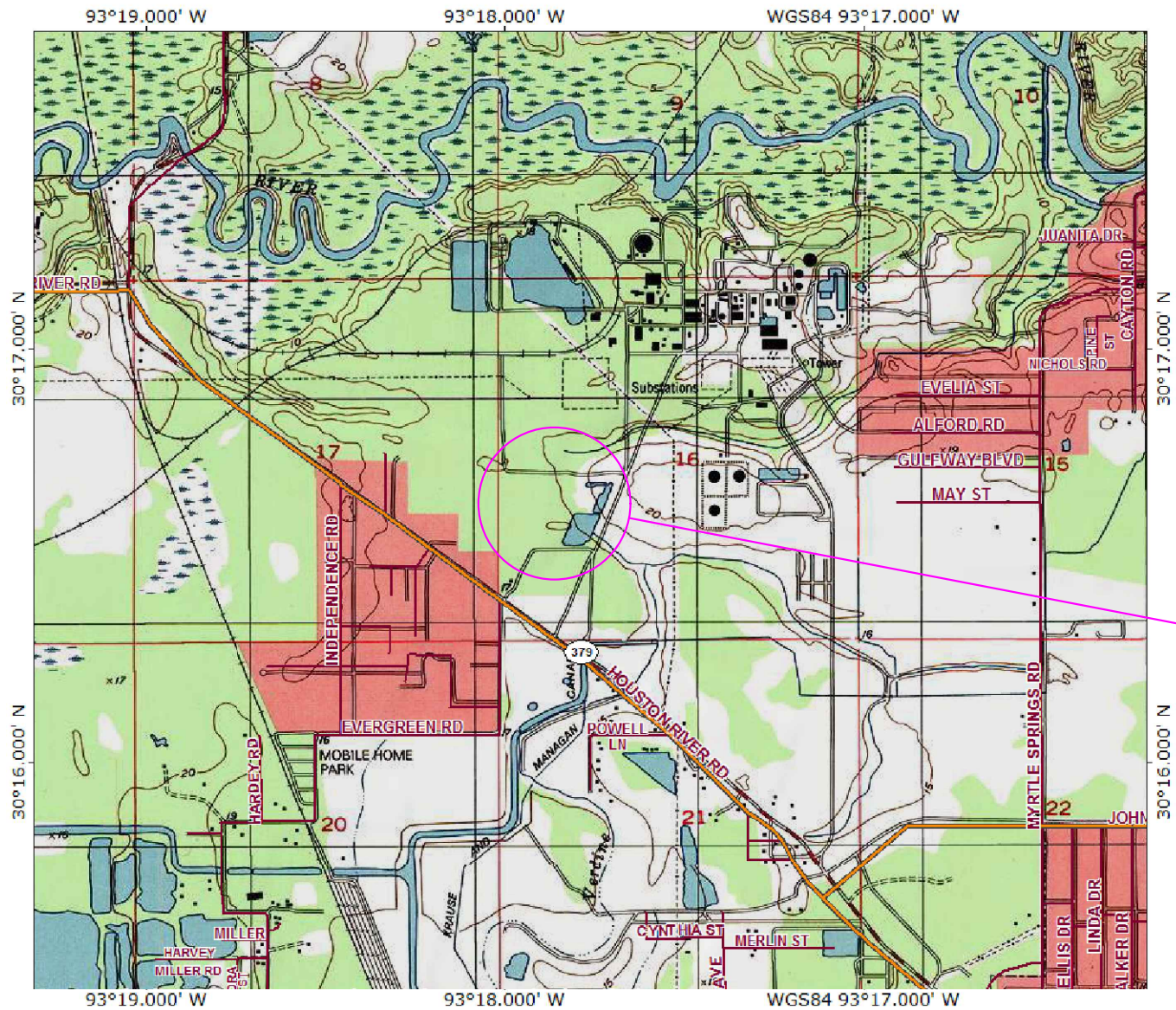
evaluation conducted and results presented in the ASD, Entergy continued with detection monitoring in accordance with §257.94.

- In 2018, Entergy completed a successful alternate source demonstration (ASD) per §257.94(e)(2) in response to statistically significant increases (SSIs) identified for calcium in well CCR-7 during the first half of 2018 detection monitoring event. The ASD, which demonstrated that the SSI is the result of natural variation in groundwater quality, was certified by a Louisiana-registered professional engineer and were placed into the facility's operating record. Based on the successful evaluation conducted and results presented in the ASD, Entergy continued with detection monitoring in accordance with §257.94.
- In 2019, Entergy completed a successful alternate source demonstration (ASD) per §257.94(e)(2) in response to statistically significant increases (SSIs) identified for calcium in wells CCR-5 and CCR-7 during the second half of 2018 detection monitoring event. The ASD, which demonstrated that the SSIs are the result of natural variation in groundwater quality, was certified by a Louisiana-registered professional engineer and were placed into the facility's operating record. Based on the successful evaluation conducted and results presented in the ASD, Entergy continued with detection monitoring in accordance with §257.94.
- The 2024 detection monitoring sampling was performed during March, June, September, and December 2024. Results confirmed SSIs for calcium in June and December 2024 in well CCR-7 and in December 2024 for well CCR-5. The ASDs referenced above previously demonstrated that the SSIs for calcium in wells CCR-5 and CCR-7 are the result of natural variation in groundwater quality and the basis for the prior ASDs remain applicable.
- Groundwater flow direction in 2024 was west to east in the first continuous permeable zone beneath the landfill which is consistent with historical observations, refer to Figures 3 and 4 in Appendix A.
- Investigation activities have shown that the rate of groundwater flow in the vicinity of the CADL is 3.42×10^{-4} feet per day. The rate was determined from the hydraulic conductivity from the previous hydrogeologic investigations of the Lower Sand and from the December 2024 hydraulic gradient data. Average soil porosity was determined to be 0.3725 (Geotechdata.info, 2013).
- No problems were encountered during 2024 with regard to the groundwater monitoring system. Therefore, no actions were required to modify the system.
- The facility remained in detection monitoring for the duration of 2024 because no SSIs were detected that were not addressed by the prior ASDs.

7.0 PROJECTED ACTIVITIES FOR 2025

Semi-annual detection monitoring events are planned for June and December 2025.

APPENDIX A
SITE MAP AND GROUNDWATER FLOW DIRECTION



SITE LOCATION

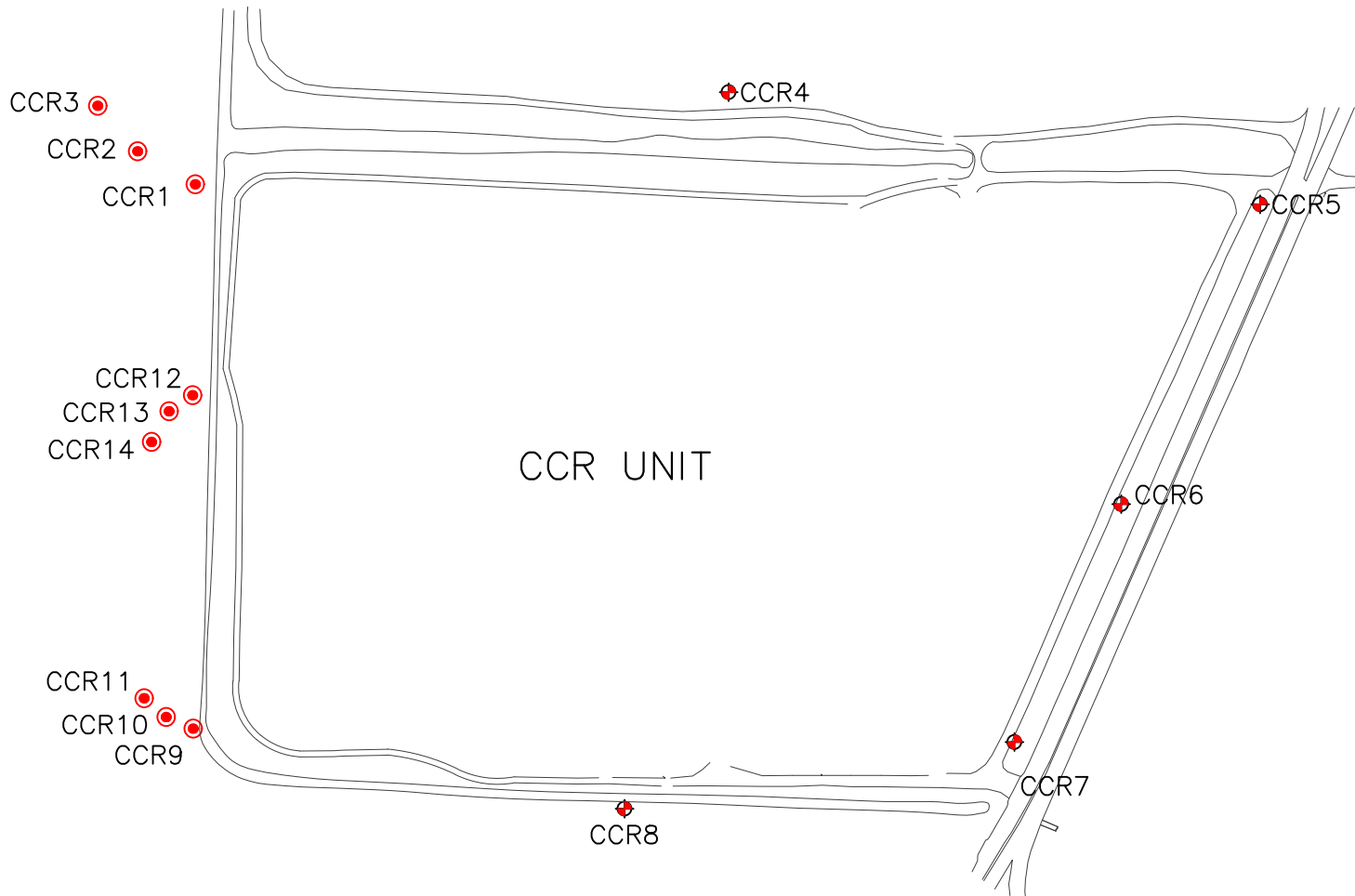
**COAL ASH DISPOSAL LANDFILL
SITE LOCATION MAP**

NELSON POWER GENERATING STATION
3500 HOUSTON RIVER ROAD, WESTLAKE, LOUISIANA


Pivotal Engineering LLC
 CIVIL, ELECTRICAL, ENVIRONMENTAL & MECHANICAL ENGINEERING
 1515 POYDRAS STREET, STE. 1875
 NEW ORLEANS, LA. 70112
 (504) 799-3653 (504) 799-3654(FAX)

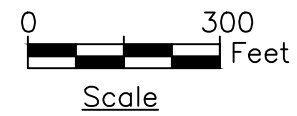
DATE	DESCRIPTION	BY

SCALE: NOT TO SCALE	DRAWN BY: Y.S.
DATE: JANUARY 4, 2015	CHECKED BY: T.E.
JOB NO. 15-125	



Legend

- Upgradient Well Location
- ⊕ Downgradient Well Location

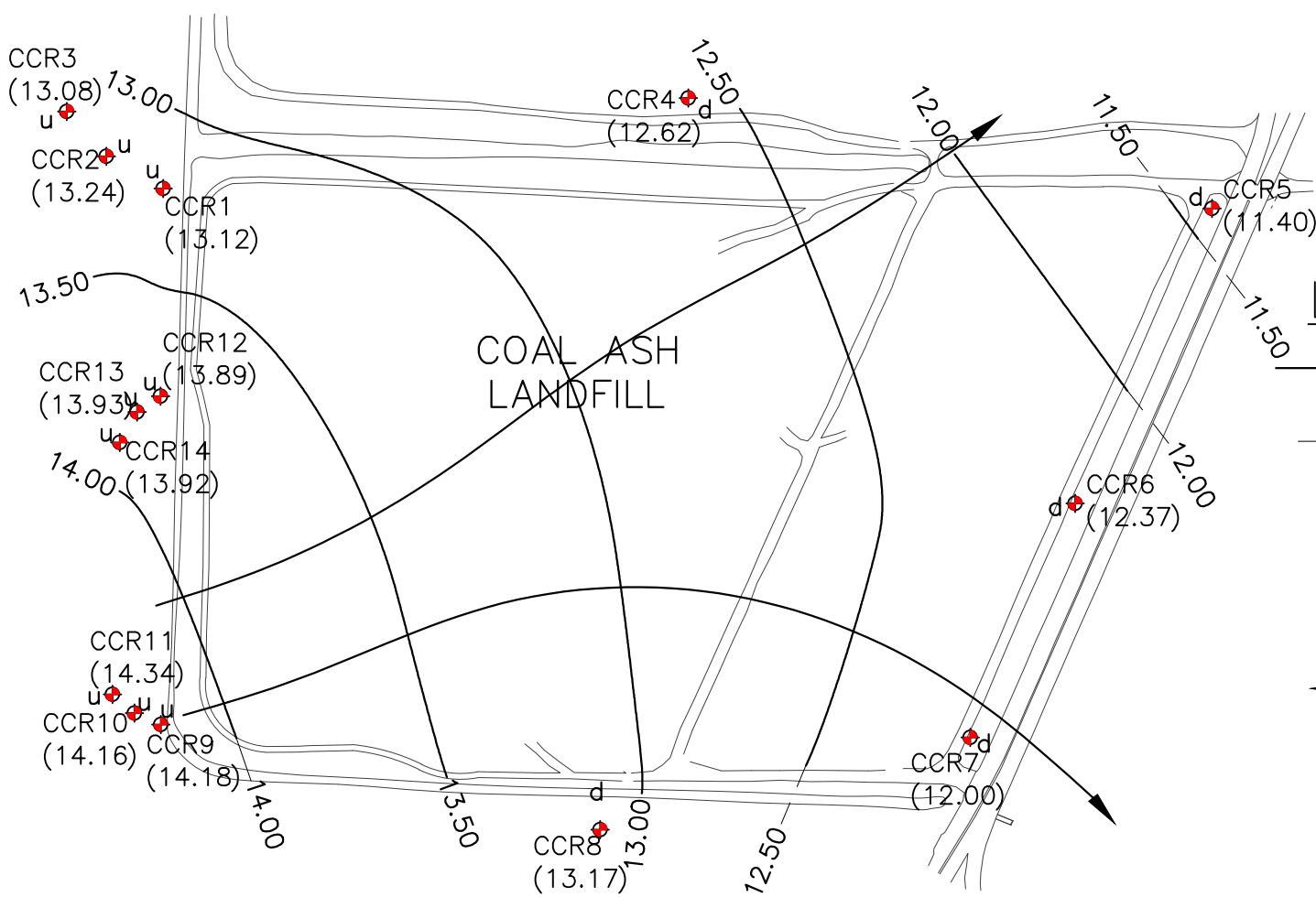


**CCR UNIT
SITE MAP**

ENTERGY LOUISIANA, LLC
ROY S. NELSON PLANT
HOUSTON RIVER ROAD, WESTLAKE, LOUISIANA

DATE	DESCRIPTION REVISIONS	BY

SCALE: AS NOTED	DRAWN BY: B.S.	2 Fig. No.
DATE: JAN 06/16	CHECKED BY: T.E.	



Legend

- 13.00 Ground Water Elevation Contour, ft
- Extrapolated Contour
- (12.92) Ground Water Elevation, ft NAVD 88
- Landfill Area
- Well Location
- Direction of Ground Water Flow
- UP GRADIENT
- DOWN GRADIENT
- 0 300 Feet

**COAL ASH LANDFILL
POTENTIOMETRIC ELEVATION MAP
June 28, 2024**

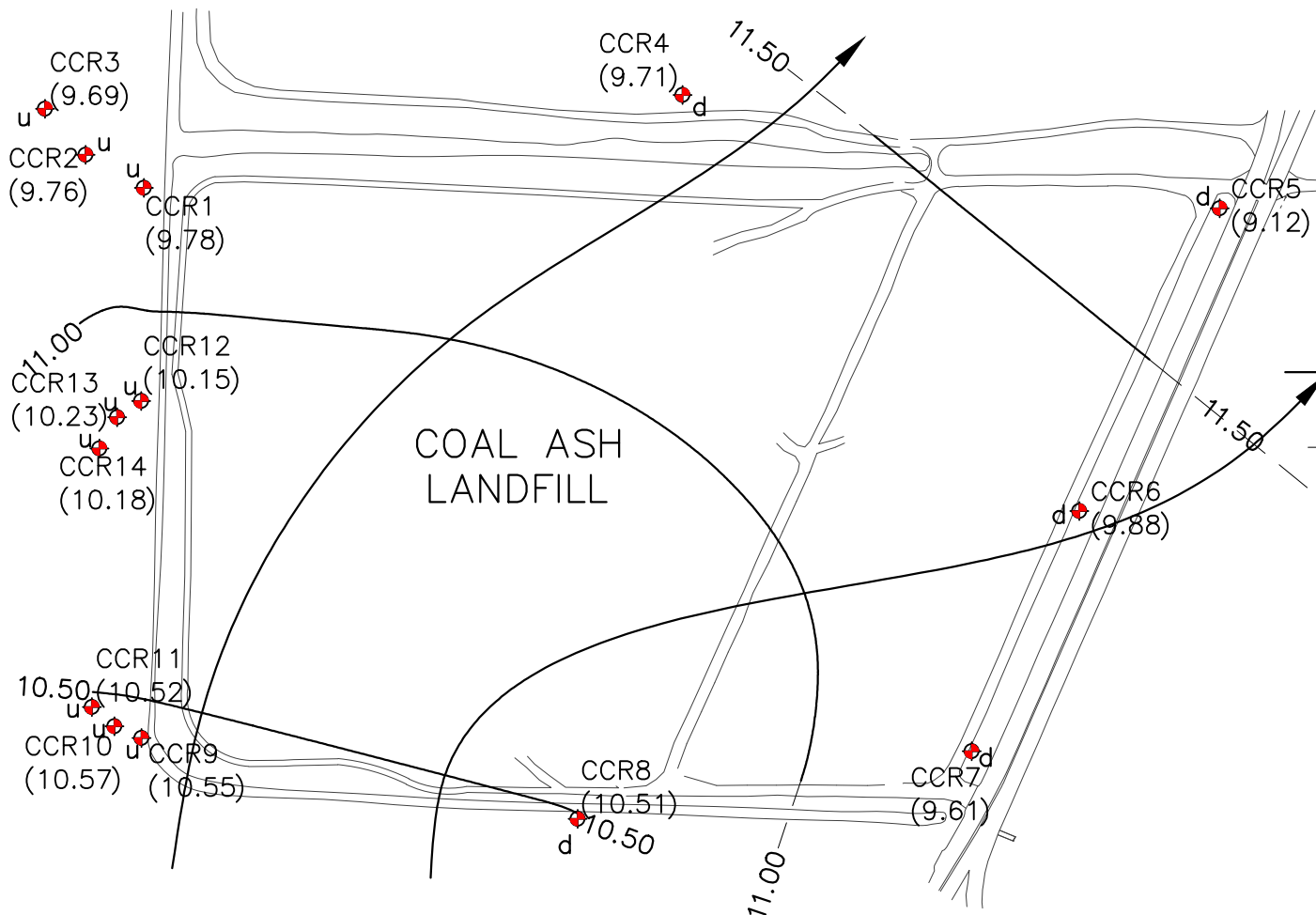
ENERGY LOUISIANA, LLC
ROY S. NELSON PLANT
HOUSTON RIVER ROAD, WESTLAKE, LOUISIANA

pivotal
engineering
A Full Service Civil, Environmental and MEP Firm

1515 POYDRAS STREET, SUITE 1150
NEW ORLEANS, LA 70112
(504) 799-3653 (504) 799-3654 (FAX)
www.pivotaleng.com

DATE	DESCRIPTION	BY

SCALE: AS NOTED	DRAWN BY: B.S.	3
DATE: September 10, 2024	CHECKED BY: T.E.	
JOB NO. 20-139		FIG. NO.



Legend

- 13.00 — Ground Water Elevation Contour, ft
 - (12.92) — Extrapolated Contour
 - Ground Water Elevation, ft NAVD 88
 - Landfill Area
 - Well Location
 - Direction of Ground Water Flow
 - u** UP GRADIENT
 - d** DOWN GRADIENT
- 0 300
Feet
Scale

**COAL ASH LANDFILL
POTENTIOMETRIC ELEVATION MAP
DECEMBER 17-18, 2024**

ENTERGY LOUISIANA, LLC
ROY S. NELSON PLANT
HOUSTON RIVER ROAD, WESTLAKE, LOUISIANA

pivotal
engineering
A Full Service Civil, Environmental and MEP Firm

1515 POYDRAS STREET, SUITE 1150
NEW ORLEANS, LA 70112
(504) 799-3653 (504) 799-3654 (FAX)
www.pivotaleng.com

DATE	DESCRIPTION	BY

SCALE: AS NOTED	DRAWN BY: B.S.	4 FIG. NO.
DATE: January 13, 2025	CHECKED BY: T.E.	
JOB NO. 20-139		

APPENDIX B
SAMPLING SCHEDULE AND ANALYTICAL DATA

Well	CCR-1 (BG)	CCR-2 (BG)	CCR-3 (BG)	CCR-4	CCR-5	CCR-6	CCR-7	CCR-8	CCR-9 (BG)	CCR-10 (BG)	CCR-11 (BG)	CCR-12 (BG)	CCR-13 (BG)	CCR-14 (BG)
Date	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24
40 CFR 257 Appendix III Parameters*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
40 CFR 257 Appendix IV Parameters**	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Date	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24
40 CFR 257 Appendix III Parameters*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
40 CFR 257 Appendix IV Parameters**	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Date	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24
40 CFR 257 Appendix III Parameters*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
40 CFR 257 Appendix IV Parameters**	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Date	12/17/24	12/17/24	12/17/24	12/18/24	12/18/24	12/18/24	12/18/24	12/18/24	12/18/24	12/18/24	12/18/24	12/18/24	12/18/24	12/18/24
40 CFR 257 Appendix III Parameters*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
40 CFR 257 Appendix IV Parameters**	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

*40 CFR 257 Appendix III Parameters collected on reference date and include Boron, Calcium, Chloride, Fluoride, pH, Sulfate, and Total Dissolved Solids. Laboratory reports to follow.

**40 CFR 257 Appendix IV Parameters collected on reference date and include Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Fluoride, Lead, Lithium, Mercury, Molybdenum, Selenium and Thallium

Note: Detection monitoring results for pH are located on the next table.

Radium 226 and 228 combined were not analyzed in 2023 due to 100% non-detect in previous background analytical results



Well	CCR-1 (BG)	CCR-2 (BG)	CCR-3 (BG)	CCR-4	CCR-5	CCR-6	CCR-7	CCR-8	CCR-9 (BG)	CCR-10 (BG)	CCR-11 (BG)	CCR-12 (BG)	CCR-13 (BG)	CCR-14 (BG)
Date	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24	3/1/24
pH (S.U.)	6.81	6.68	6.87	6.77	7.08	7.09	7.08	6.62	6.99	7.20	7.15	6.52	7.59	7.09
Date	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24	6/28/24
pH (S.U.)	6.87	6.91	6.81	6.91	7.07	7.00	7.27	6.98	7.32	7.51	7.45	6.71	7.60	7.57
Date	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24	9/27/24
pH (S.U.)	6.77	6.71	6.77	7.07	7.52	7.47	7.47	7.24	7.74	7.74	7.71	7.02	7.74	7.62
Date	12/17/24	12/17/24	12/17/24	12/18/24	12/18/24	12/18/24	12/18/24	12/18/24	12/18/24	12/18/24	12/18/24	12/18/24	12/18/24	12/18/24
pH (S.U.)	6.02	5.93	5.85	6.27	6.54	6.41	6.37	6.15 / 6.42*	6.42	6.33	6.14	5.84	6.41	5.40

S.U. - Standard Units

*1/28/2025 resampling result