

ALTERNATIVE SOURCE DEMONSTRATION REPORT

2025 2nd SEMIANNUAL EVENT TEXAS STATE CCR RULE

H.W. Pirkey Power Plant Landfill Registration No. CCR 104 Hallsville, Texas

Prepared for

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November 2025

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ACRONYMS AND ABBREVIATIONS

AEP	American Electric Power
ASD	alternative source demonstration
CCR	coal combustion residuals
EPRI	Electric Power Research Institute
HDPE	high-density polyethylene
LPL	lower prediction limit
mg/L	milligrams per liter
SSI	statistically significant increase
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TRRP	Texas Risk Reduction Program
UPL	upper prediction limit
USEPA	United States Environmental Protection Agency

1. INTRODUCTION AND SUMMARY

This alternative source demonstration (ASD) report has been prepared to address statistically significant increases (SSIs) for boron, chloride, and fluoride in the groundwater monitoring network at the H.W. Pirkey Plant Landfill (Landfill) in Hallsville, Texas, following the second semiannual detection monitoring event of 2025. The H.W. Pirkey Plant has four coal combustion residuals (CCR) storage units regulated by the Texas Commission on Environmental Quality (TCEQ) under Registration No. CCR104, including the Landfill (**Figure 1**). The Landfill is the only active CCR unit; the other three CCR units have been closed by removal. The western side of the Landfill overlies a former lignite mining area, as shown on **Figure 2**.

Background groundwater concentrations for the Landfill were initially calculated in January 2018 (Geosyntec Consultants, Inc. [Geosyntec] 2018) and have been updated intermittently in accordance with the *Statistical Analysis Plan* prepared for the Landfill (Geosyntec 2021a). Because of the presence of lignite mine spoils within the screened interval at downgradient well AD-34, an ASD was certified on January 7, 2020 which resulted in a switch in the groundwater monitoring network statistics from interwell tests to intrawell tests for evaluation of pH, sulfate, and total dissolved solids for all wells (Geosyntec 2020). Background groundwater concentrations were updated because of this (Geosyntec 2021b); they were also updated in 2024 in consideration of the additional data that had been collected since the 2021 update (Geosyntec 2024).

Prediction limits are used to determine whether there has been an SSI for a groundwater monitoring parameter for the Landfill and are calculated based on a one-of-two retesting procedure in accordance with the Unified Guidance (United States Environmental Protection Agency [USEPA] 2009) and the *Statistical Analysis Plan*. With this procedure, an SSI is concluded only if both an initial sample and a resample exceed the upper prediction limit (UPL) or, in the case of pH, are below the lower prediction limit (LPL). In practice, if the initial result was not above the UPL or, for pH, was not below the LPL, a resample was not collected or analyzed.

The second semiannual detection monitoring event of 2025 was performed in September 2025 (initial sampling event in accordance with Texas Administrative Code (TAC) Title 30 §352.941(a) [30 TAC §352.941(a)]. The results were compared to the calculated prediction limits, and where initial exceedances were identified, verification resampling was completed in November 2025. Following verification resampling, SSIs were identified for boron and chloride at well AD-23 and boron, chloride, and fluoride at AD-36 by intrawell analysis (Geosyntec 2025). A summary of the detection monitoring analytical results for the downgradient compliance wells and the calculated prediction limits to which they were compared is provided in Table 1.

1.1 CCR Rule Requirements

TCEQ regulations regarding detection monitoring programs for CCR landfills and surface impoundments provide owners and operators with the option to make an ASD when an SSI is identified:

In making a demonstration under this section, the owner or operator must . . . “within 90 days of making a determination of an SSI over the background value for any Appendix III constituent adopted by reference in §352.1421 of this title, submit a report prepared and certified in accordance with §352.4 of this title (relating to Engineering and Geoscientific

Information), to the executive director, and any local pollution agency with jurisdiction that has requested to be notified, demonstrating that a source other than a coal combustion residuals unit caused the SSI or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.” (30 TAC §352.941(c)(2)).

Pursuant to 30 TAC §352.941(c)(2), Geosyntec has prepared this ASD report to document that the SSIs identified for boron and chloride at well AD-23 and for boron, chloride, and fluoride at well AD-36 are from a source other than the Landfill.

1.2 Demonstration of Alternative Sources

An evaluation was completed to assess possible alternative sources to which the identified SSIs could be attributed. Alternative sources were categorized into the following five types, based on methods provided by the Electric Power Research Institute (EPRI 2017):

- ASD Type I: Sampling Causes
- ASD Type II: Laboratory Causes
- ASD Type III: Statistical Evaluation Causes
- ASD Type IV: Natural Variation
- ASD Type V: Anthropogenic Sources

A demonstration was conducted to show that the identified SSIs were based on a Type IV cause and not by a release from the Pirkey Landfill.

2. SUMMARY OF SITE CONDITIONS

The Landfill design and construction, regional geology and site hydrogeology, and groundwater monitoring network and flow conditions are described below.

2.1 Landfill Design and Construction

The Pirkey Landfill was designed to receive CCR materials including fly ash, bottom ash, economizer ash, and stabilized flue gas desulfurization sludge (Arcadis 2022). The Landfill consists of cells which have been constructed periodically since 1984, when the first cell was developed at the northeastern corner of the Landfill. The most recent cell that has been developed was constructed at the southeast corner of the Landfill beginning in 2018. The Landfill is now approximately 134 acres in size.

The Landfill was constructed within an unnamed tributary creek, and the base of the Landfill is partially excavated into the creek bed (Arcadis 2022). Earthen embankments were installed around portions of the Landfill to control stormwater flow. Leachate is drained from the Landfill via bottom area drains and collection pipes installed at the base of the Landfill. From previous investigations of the Landfill summarized by Arcadis (2022), the Landfill was constructed with an engineered liner. The initial cells included a 3-foot thick compacted soil liner. In 1995, the design was modified to include a 60-mil thick high-density polyethylene (HDPE) geomembrane liner overlying a geosynthetic clay liner. The most recent cell was constructed with a single-composite liner system consisting of, from top to bottom: a 2-foot thick leachate drainage layer; a 60-mil thick HDPE geomembrane liner; and a 2-foot thick compacted clay liner (Akron Consulting, LLC 2022).

Since July 2024, the 2018 expansion has been the only cell still actively receiving waste. The approximate area of active waste placement is shown in **Figure 2**. The remainder of the Landfill is either considered closed and covered by a final vegetative cover or closure turf material or considered inactive with temporary soil cover (GEI 2025).

2.2 Regional Geology / Site Hydrogeology

The Landfill is positioned on an outcrop of the Eocene-age Recklaw Formation, which consists predominantly of clay and fine-grained sand (Arcadis 2022). The Recklaw Formation is underlain by the Carrizo Sand, which crops out in the topographically lower southern portion of the plant. The Carrizo Sand consists of fine- to medium-grained sand interbedded with silt and clay.

The very-fine- to fine-grained clayey and silty sand located below and adjacent to the Landfill, between an elevation of approximately 270 and 330 feet above mean sea level is considered to be the uppermost aquifer below this CCR unit (Arcadis, 2022).

2.3 Groundwater Monitoring Network and Flow Conditions

The monitoring well network for the Landfill monitors groundwater within the uppermost aquifer. Geologic cross sections C-C' and D-D' from Arcadis (2022), provided as **Attachment A**, show the subsurface geometry of the uppermost aquifer (indicated on the figures as clayey silty sand, brown to gray) underlying the Landfill. These geologic cross sections also demonstrate lateral continuity of the uppermost aquifer, spanning both directions underneath the entire length of the Landfill.

The Landfill monitoring well network consists of upgradient monitoring wells AD-8, AD-12, AD-16, and AD-27, and downgradient compliance wells AD-23, AD-34, and AD-36. AD-36 was installed in April 2019 (after the initial monitoring well network was already in place) as a replacement for well AD-35, which was decommissioned in November 2018 due to the Landfill expansion (Arcadis 2022). The groundwater flow direction near the Landfill is southwesterly (**Figure 1**). Seasonal variability in groundwater flow direction has not been observed since the monitoring well network was installed.

3. ALTERNATIVE SOURCE DEMONSTRATION

The ASD evaluation method and proposed alternative source of the identified SSIs (boron and chloride at well AD-23 and boron, chloride, and fluoride at well AD-36) and the future groundwater sampling requirements are described below.

3.1 Proposed Alternative Source

An initial review of site geochemistry, site historical data, and laboratory quality assurance and quality control data did not identify an alternative source for these constituents due to Type I (sampling), Type II (laboratory), Type III (statistical evaluation), or Type V (anthropogenic impact) issues. Groundwater sampling, laboratory analysis, and statistical evaluations were generally completed in accordance with 30 TAC §352.931(a) and the draft TCEQ guidance for groundwater monitoring (TCEQ 2020). Based on a review of groundwater data and recent site construction events, the identified SSIs were attributed to natural variation associated with the aquifer unit beneath the Landfill, which is a Type IV issue.

3.1.1 Comparison to Background Concentrations

A review of boron, chloride, and fluoride concentrations at both AD-23 and AD-36 monitoring found that they are within the range of concentrations reported at the upgradient monitoring wells in the groundwater monitoring network (**Figure 3**). The upgradient locations have a range of reported results, with at least one upgradient location having a greater mean concentration compared to downgradient wells AD-23 and AD-36. Given that the uppermost aquifer unit is horizontally continuous in the area surrounding the Landfill (**Attachment A**), migration of these constituents from upgradient locations to downgradient wells is possible. Therefore, the concentrations reported at AD-23 and AD-36 are within the expected range attributable to natural variation within the aquifer.

This finding is further supported by a statistical comparison of the downgradient results of interest to interwell prediction limits, which pools data from multiple background locations to establish a site-specific background value. While interwell prediction limits were previously determined to be inappropriate for the Landfill due to the influence of mine spoils on downgradient well AD-36 (Geosyntec 2020), the comparison is completed here to further assess concentrations at downgradient wells AD-23 and AD-36 compared to background. Interwell prediction limits were calculated using data from AD-8, AD-12, AD-16, and AD-27 from May 2016 through September 2025 (**Attachment B**).¹ A comparison of the constituent concentrations at AD-23 and AD-36 to the calculated interwell prediction limits found that the relevant concentrations are below the calculated background values based on the pooled background dataset (**Table 2**). This further supports the conclusion that the reported constituent concentrations at AD-23 and AD-36 are within the expected range for the Site based on comparison to background groundwater chemistry.

¹ Outliers identified by Tukey's test were removed from the background dataset prior to calculation of the prediction limits. An analysis of variance (ANOVA) test was not completed; while initial background calculations identified significant variability in the background dataset for all Appendix III parameters except pH (Geosyntec 2018), ANOVA tests were not completed in this assessment as the calculation of background value reflective of this variability was a goal of the calculations.

In addition to being comparable to background concentrations, the groundwater boron concentrations at AD-23 and AD-36 and fluoride concentrations at AD-36 are an order of magnitude lower than the Texas Risk Reduction Program (TRRP) Class I residential ingestion pathway limits ($^{GW}GW_{Ing}$) of 4.9 milligrams per liter (mg/L) for boron and 4.0 mg/L for fluoride, respectively (TCEQ 2009; updated TCEQ 2025). Residential ingestion pathway limits have not been established for chloride, as it is not necessarily of concern from a human health standpoint (TCEQ 2025). However, the reported chloride concentrations at AD-23 and AD-36 are an order of magnitude lower than the USEPA secondary maximum contaminant level for chloride, which is 250 mg/L (TCEQ 2025).

3.1.2 Comparison to Historical Regional Concentrations

Regional scale sampling data from shallow wells located in Harrison County (**Attachment C**, Broom and Myers 1966) provide further support for evidence of naturally occurring COC concentrations (excluding boron, which did not have available data) exceeding those observed at the site. At the time of publication in 1966 (approximately 20 years prior to initiation of operations at the Pirkey Plant), the average chloride and fluoride concentrations from wells screened at depths less than 60 feet were all greater than the recent concentrations reported at AD-23 and AD-36 (**Table 3**). These data indicate that chloride and fluoride concentrations vary regionally within groundwater at comparable depths.

While boron data was not reported in the shallow wells, TCEQ established a Texas-specific soil median background concentration of 30 milligrams per kilogram of boron in 30 TAC §350.51(m). Given the abundance of boron in Texas soils, some contribution of boron to groundwater from the aquifer is anticipated.

3.1.3 Leachate Mixing Assessment

The potential for Landfill leachate mixing to account for geochemical changes to groundwater at monitoring wells AD-23 and AD-36 was evaluated using a physical mixing assessment. Piper diagrams were created for AD-23 (**Figure 4**) and AD-36 (**Figure 5**) which display the relative proportions of major cations and anions in aqueous samples compared to the composition of the Landfill leachate. Groundwater data from well AD-23 collected in October 2016 and data collected from well AD-36 in August 2019 (the first sample collected from each location that contained less than 15% ionic charge imbalance error) were used to represent initial conditions at the monitoring locations (100% groundwater), and Landfill leachate data collected in February 2023 was used to represent the potential source of CCR impacts to groundwater. The laboratory analytical report for the Landfill leachate samples is provided as **Attachment D**. Geochemist's Workbench® was used to mix the initial groundwater sample for each well with the leachate sample at varying ratios in order to evaluate the changes in groundwater geochemistry that would be expected under varying leachate infiltration conditions. The outputs of the mixing modeling were compared to the subsequent groundwater samples at each well of interest that had an ionic charge imbalance less than 15%, indicating high sample quality.

As illustrated in **Figures 4 and 5**, the mixing models indicate infiltration of Landfill leachate is expected to result in increases to the relative proportions of calcium (major cation) and sulfate (major anion). In contrast to the mixing model outputs, AD-23 groundwater has demonstrated stability with regards to major cation relative proportions and a gradual decrease in relative sulfate proportions associated with a gradual increase in chloride dominance. Likewise, AD-36 groundwater has also demonstrated major cation stability and general stability in major anion

relative proportions. Infiltration of leachate is predicted to result in contrasting changes to major ion relative proportions relative to the observed trends at both wells of interest since monitoring began. The inconsistency between recently collected data at AD-23 and AD-36 and the mixing model outputs for both wells of interest indicates that changes in concentrations at these wells are a function of a source other than Landfill leachate infiltration.

3.2 Sampling Requirements

As the ASD presented above supports the position that the identified SSIs were not due to a release from the Pirkey Landfill, the unit will remain in the detection monitoring program. Groundwater at the unit will continue to be sampled for Appendix III parameters semiannually.

4. CONCLUSIONS AND RECOMMENDATIONS

The preceding information serves as the ASD prepared in accordance with 30 TAC §352.941(c)(2) and supports the position that the SSIs for boron and chloride at well AD-23 and boron, chloride, and fluoride at well AD-36 identified during semiannual detection monitoring in September 2025 were not due to a release from the Landfill. The identified SSIs were instead attributed to natural groundwater chemical variability within the aquifer unit. Therefore, no further action is warranted, and the Pirkey Landfill will remain in the detection monitoring program. Certification of this ASD by a qualified professional engineer is provided in **Attachment E**.

5. REFERENCES

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- USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance. United States Environmental Protection Agency. EPA 530/R-09-007. March.

TABLES

**Table 1. Detection Monitoring Data Summary
Pirkey - Landfill**

Analyte	Unit	Description	AD-23		AD-34	AD-36	
			9/10/2025	11/17/2025	9/9/2025	9/9/2025	11/17/2025
Boron	mg/L	Intrawell Background Value (UPL)	0.0612		0.108	0.0747	
		Analytical Result	0.525	0.343	0.063	0.099	0.114
Calcium	mg/L	Intrawell Background Value (UPL)	0.503		46.1	1.22	
		Analytical Result	0.19	--	39.2	1.43	1.20
Chloride	mg/L	Intrawell Background Value (UPL)	8.92		8.97	11.8	
		Analytical Result	11.1	10.6	7.54	18.8	19.5
Fluoride	mg/L	Intrawell Background Value (UPL)	0.156		1.58	0.098	
		Analytical Result	0.04	--	1.17	0.12	0.10
pH	SU	Intrawell Background Value (UPL)	5.0		4.1	5.2	
		Intrawell Background Value (LPL)	3.1		2.9	3.7	
		Analytical Result	4.1	--	4.0	4.2	--
Sulfate	mg/L	Intrawell Background Value (UPL)	13.6		1,340	4.77	
		Analytical Result	7.44	--	955	4.99	3.75
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	104		1,840	84.9	
		Analytical Result	60	--	1,670	60	--

Notes:

1. **Bold values exceed the background value.**

2. Background values are shaded gray.

LPL: lower prediction limit

mg/L: milligrams per liter

SU: standard units

UPL: upper prediction limit

**Table 2. Interwell Prediction Limit Data Comparison
Pirkey - Landfill**

Analyte	Unit	Description	AD-23		AD-36	
			9/10/2025	11/17/2025	9/9/2025	11/17/2025
Boron	mg/L	Interwell Background Value (UPL)	1.61			
		Analytical Result	0.525	0.343	0.099	0.114
Calcium	mg/L	Interwell Background Value (UPL)	109			
		Analytical Result	0.19	--	1.43	1.20
Chloride	mg/L	Interwell Background Value (UPL)	32.5			
		Analytical Result	11.1	10.6	18.8	19.5
Fluoride	mg/L	Interwell Background Value (UPL)	5.20			
		Analytical Result	0.04	--	0.12	0.10
pH	SU	Interwell Background Value (UPL)	5.8			
		Interwell Background Value (LPL)	2.6			
		Analytical Result	4.1	--	4.2	--
Sulfate	mg/L	Interwell Background Value (UPL)	228			
		Analytical Result	7.44	--	4.99	3.75
Total Dissolved Solids	mg/L	Interwell Background Value (UPL)	462			
		Analytical Result	60	--	60	--

Notes:

1. Bold values exceed the background value.

2. Background values are shaded gray.

LPL: lower prediction limit

mg/L: milligrams per liter

SU: standard units

UPL: upper prediction limit

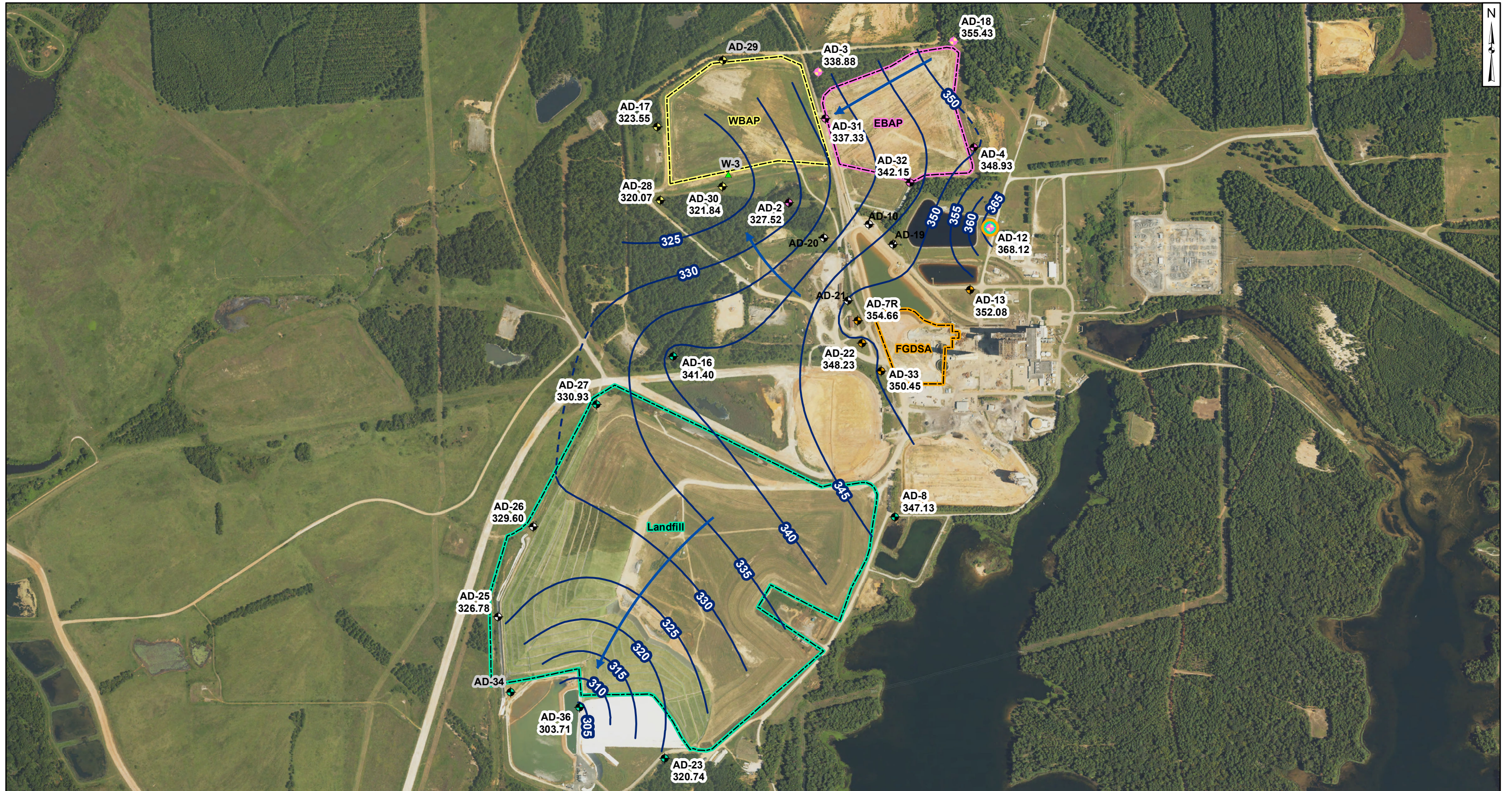
**Table 3. Average and Maximum Historical Monitoring Data
Pirkey – Landfill**

Analyte	Historical Data		AD-23		AD-36	
	Average	Maximum	Average	Maximum	Average	Maximum
Chloride	40.5	401	7.23	11.1	11.7	19.5
Fluoride	0.242	1.20	-	-	0.085	0.370

Notes:

1. Historical data found in the Harrison County Groundwater Data 1966 report for wells screened at depths less than 60 feet below ground surface.
2. Average and maximum results for AD-23 and AD-36 were calculated using analytical results collected between 2017 and 2025.
3. Only well-analyte pairs where statistically significant increases were identified during the second semiannual event of 2025 are shown.
4. All results are shown in milligrams per liter (mg/L).

FIGURES



Legend

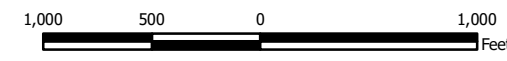
Groundwater Monitoring Wells

- Out of Network
- East Bottom Ash Pond (EBAP)
- West Bottom Ash Pond (WBAP)
- Landfill
- Flue Gas Desulfurization Stackout Area (FGDSA)
- EBAP and WBAP

- All CCR Unit Networks
- Piezometer
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)
- Approximate Groundwater Flow Direction

Notes

1. Monitoring well coordinates and water levels (collected from September 8-10, 2025) provided by AEP.
2. Site features based on information available in coal combustion residuals (CCR) Groundwater Monitoring Well Network Evaluation Update (Arcadis 2022) provided by AEP.
3. Groundwater elevation units are feet above mean sea level (ft msl).
4. Wells AD-29 and W-3 were not gauged during the September 2025 event.
5. AD-7R replaced AD-7, which was abandoned on September 12, 2023.
6. Wells shaded in gray are within the network but not used for contouring.
7. Well AD-34 had artesian characteristics during this event and was not used for contouring.
8. AD-35 was abandoned on November 13, 2018 and is not shown on the map.
9. Removal of CCR plus one foot of material for the WBAP was completed on July 26, 2022.
10. Removal of CCR plus one foot of material for the EBAP was completed on July 20, 2023.
11. Removal of CCR plus one foot of material for the FGDSA was completed on September 18, 2023.
12. Map is updated to incorporate Landfill survey data collected on May 1, 2024.
13. Aerial imagery provided by the TxGIO DataHub (dated 2024).



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**Potentiometric Contours: Uppermost Aquifer
 September 2025**

AEP Pirkey Power Plant
 Hallsville, Texas

Geosyntec
 consultants

Columbus, Ohio 2026/01/15

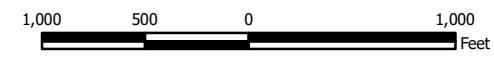
Figure 1



- Legend**
- ◆ Upgradient Well
 - ◆ Downgradient Well
 - Out of Network Well
 - ◆ Abandoned Well
 - Former Lignite Mine
 - Waste Placement
 - Landfill

Notes

- Monitoring well coordinate data provided by AEP.
- AD-35 was abandoned on November 13, 2018.
- Active Waste Placement location is approximate.
- Aerial imagery provided by ESRI, dated September 19, 2023.



Landfill Location Relative to Former Lignite Mine Area

AEP Pirkey Power Plant
Hallsville, Texas

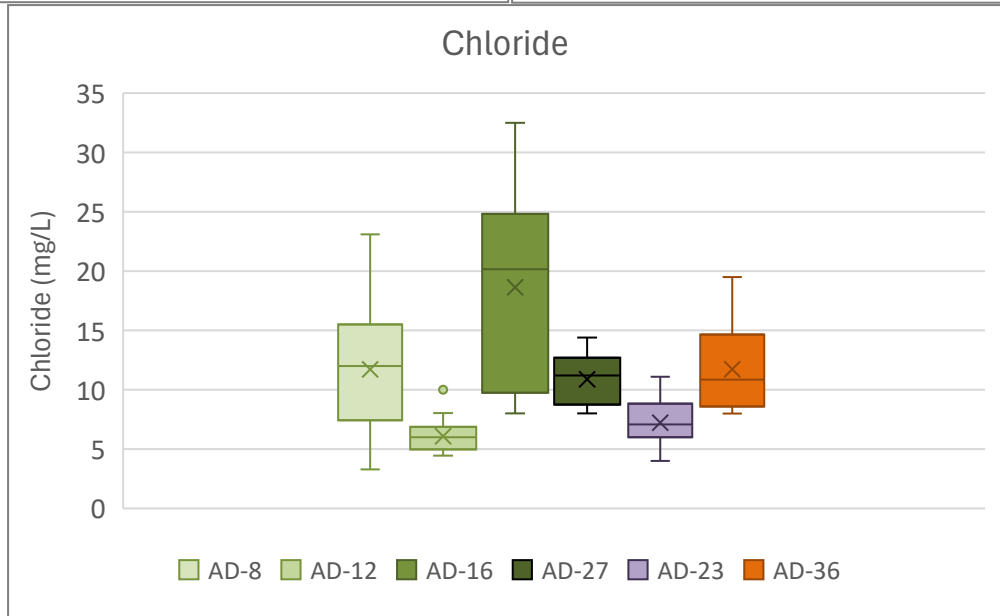
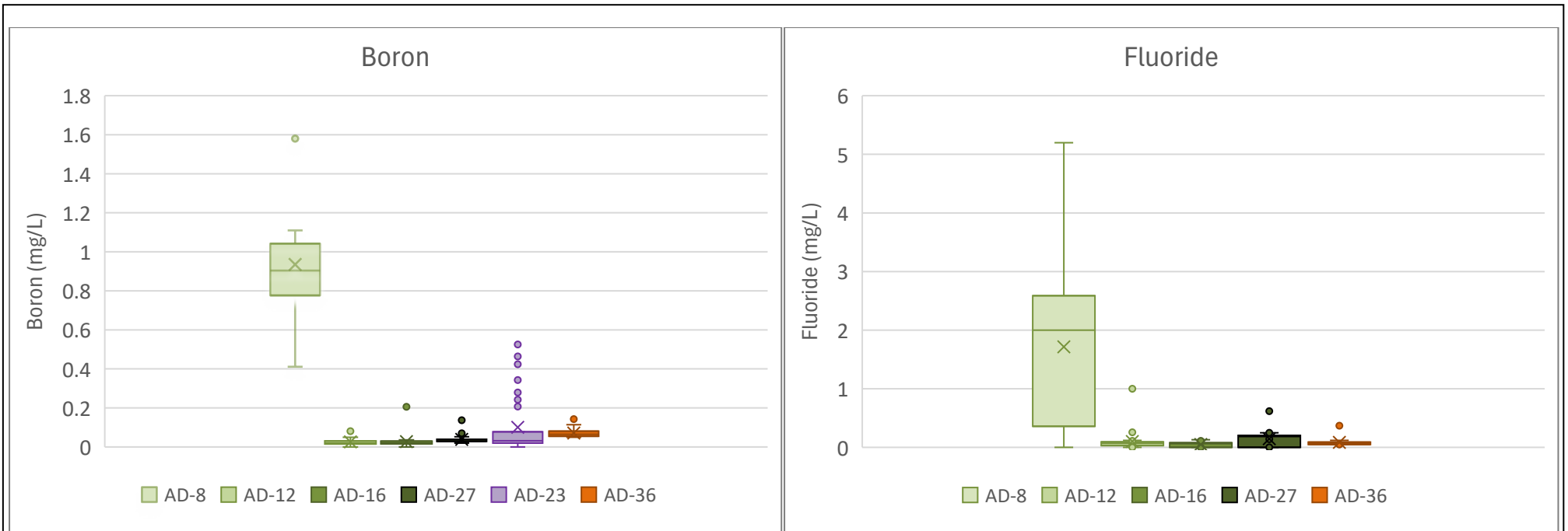
Geosyntec
consultants

Figure

2

Columbus, Ohio

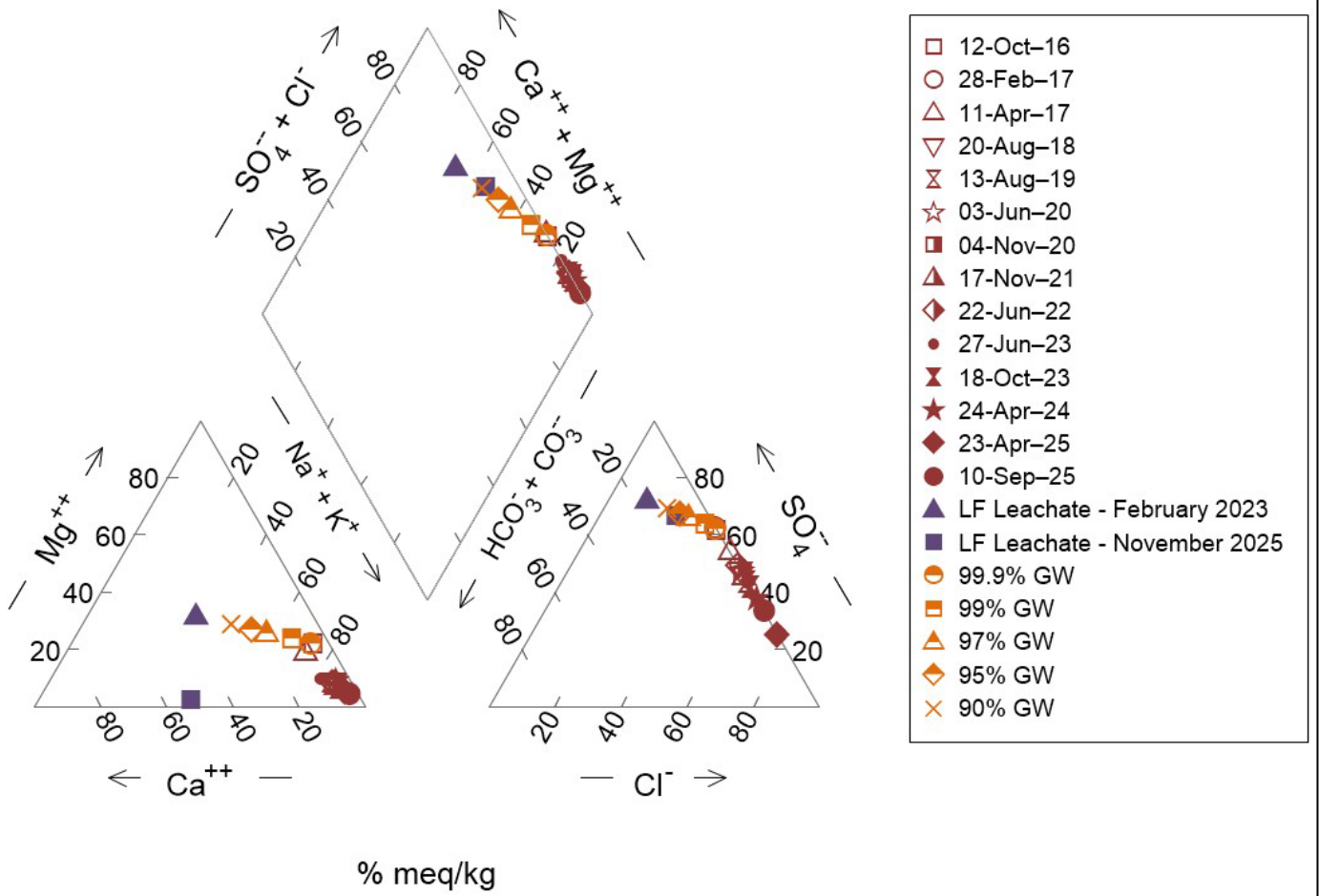
2026/03/05



Notes:

1. Only downgradient well-analyte pairs where statistically significant increases were identified during the second semiannual event of 2025 are shown.
2. Upgradient locations (AD-8, AD-12, AD-16, and AD-27) are shown in shades of green.
3. All results are shown in milligrams per liter (mg/L).

Box-and-Whisker Plots - Landfill Monitoring Network Pirkey Landfill		
		Figure 3
Columbus, OH	March 2026	



Notes:

1. Samples with greater than 15% charge imbalance are not included on the Piper diagram.
2. Landfill leachate samples are represented by the purple symbols.
3. Red samples represent AD-23 groundwater samples with less than 15% charge imbalance from the beginning of data collection to the present.
4. Mixing model outputs are represented by the orange symbols.
5. % meq/kg: percent milliequivalents per kilogram

Piper Diagram - AD-23 and Landfill Leachate

Pirkey Landfill

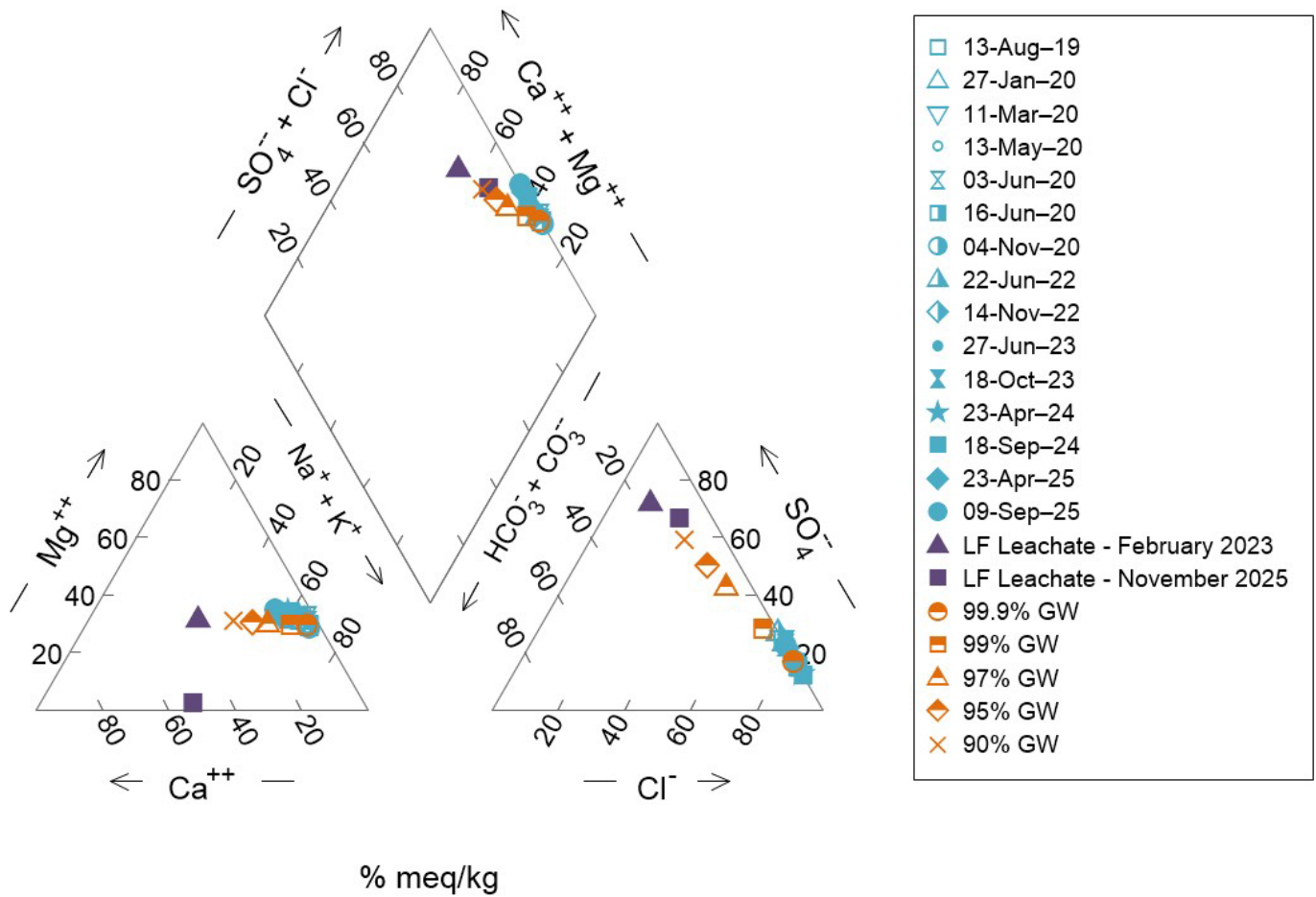
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Figure
4

Columbus, Ohio

March 2026



Notes:

1. Samples with greater than 15% charge imbalance are not included on the Piper diagram.
2. Landfill leachate samples are represented by the purple symbols.
3. Blue samples represent AD-36 groundwater samples with less than 15% charge imbalance from the beginning of data collection to the present.
4. Mixing model outputs are represented by the orange symbols.
5. % meq/kg: percent milliequivalents per kilogram

Piper Diagram - AD-36 and Landfill Leachate
Pirkey Landfill

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consultants



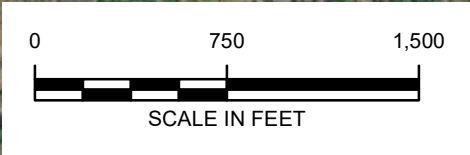
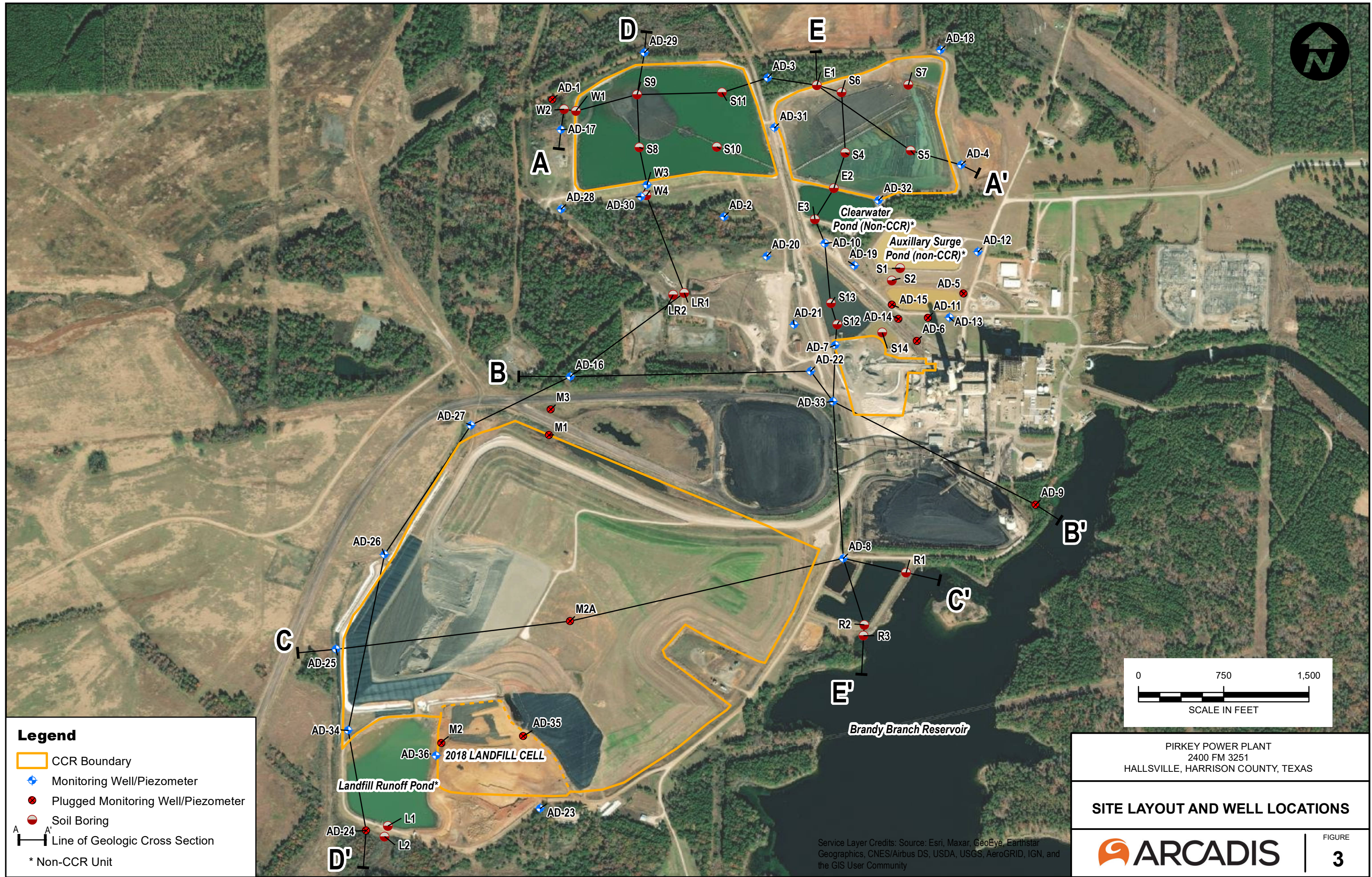
Figure
5

Columbus, Ohio

March 2026

ATTACHMENT A

Geologic Cross Sections



Legend

- CCR Boundary
- ◆ Monitoring Well/Piezometer
- Plugged Monitoring Well/Piezometer
- Soil Boring
- Line of Geologic Cross Section

* Non-CCR Unit

PIRKEY POWER PLANT
2400 FM 3251
HALLSVILLE, HARRISON COUNTY, TEXAS

SITE LAYOUT AND WELL LOCATIONS

FIGURE
3

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

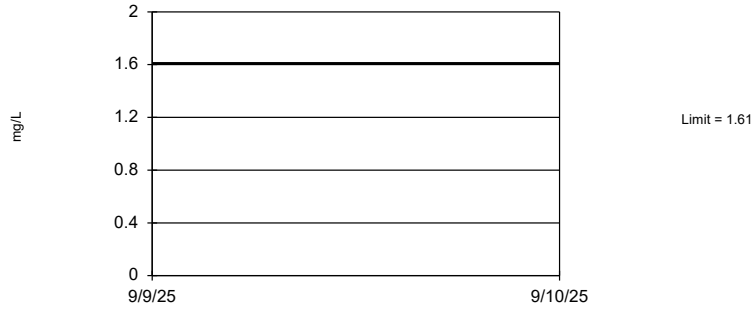
ATTACHMENT B
Interwell Prediction Limits
Statistical Calculations

Prediction Limit

Northeastern Plant Client: AEP Data: 20260223_Pirkey_LF_Sanitas_V2 Printed 2/24/2026, 2:48 PM

Constituent	Upper Lim.	Lower Lim.	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	1.61	n/a	1 future	n/a	110	n/a	n/a	4.545	n/a	n/a	0.009009	NP Inter (normality)
Calcium (mg/L)	109	n/a	1 future	n/a	111	n/a	n/a	0	n/a	n/a	0.008929	NP Inter (normality)
Chloride (mg/L)	32.5	n/a	1 future	n/a	111	n/a	n/a	0	n/a	n/a	0.008929	NP Inter (normality)
Fluoride (mg/L)	5.199	n/a	1 future	n/a	110	n/a	n/a	26.36	n/a	n/a	0.009009	NP Inter (normality)
pH (SU)	5.768	2.574	1 future	n/a	111	4.171	0.8022	0	None	No	0.025	Param Inter
Sulfate (mg/L)	228	n/a	1 future	n/a	111	n/a	n/a	0	n/a	n/a	0.008929	NP Inter (normality)
Total Dissolved Solids (mg/L)	462	n/a	1 future	n/a	111	n/a	n/a	0.9009	n/a	n/a	0.008929	NP Inter (normality)

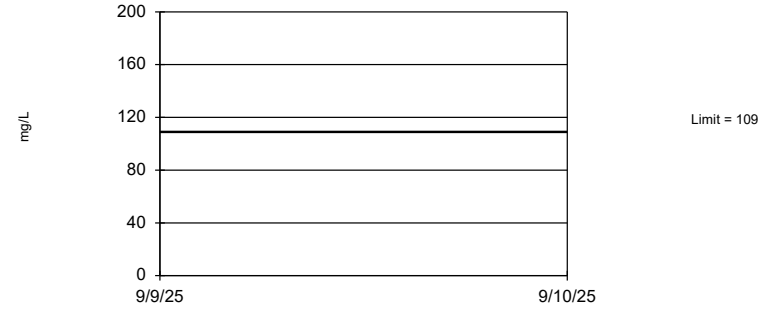
Prediction Limit
Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Chi Squared normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 110 background values. 4.545% NDs. Report alpha = 0.009009. Assumes 1 future value. Seasonality was not detected with 95% confidence.

Constituent: Boron Analysis Run 2/24/2026 2:46 PM
Northeastern Plant Client: AEP Data: 20260223_Pirkey_LF_Sanitas_V2

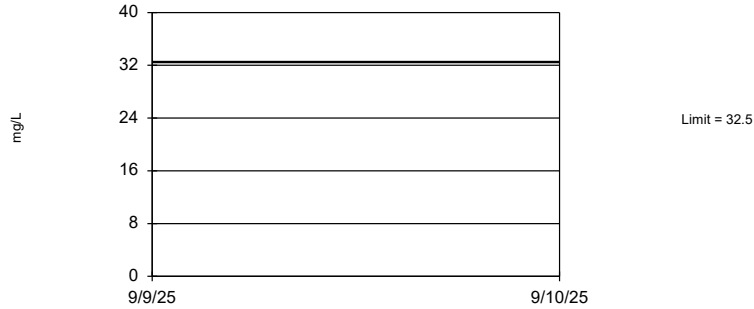
Prediction Limit
Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Chi Squared normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 111 background values. Report alpha = 0.008929. Assumes 1 future value. Seasonality was not detected with 95% confidence.

Constituent: Calcium Analysis Run 2/24/2026 2:46 PM
Northeastern Plant Client: AEP Data: 20260223_Pirkey_LF_Sanitas_V2

Prediction Limit
Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Chi Squared normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 111 background values. Report alpha = 0.008929. Assumes 1 future value. Seasonality was not detected with 95% confidence.

Constituent: Chloride Analysis Run 2/24/2026 2:46 PM
Northeastern Plant Client: AEP Data: 20260223_Pirkey_LF_Sanitas_V2

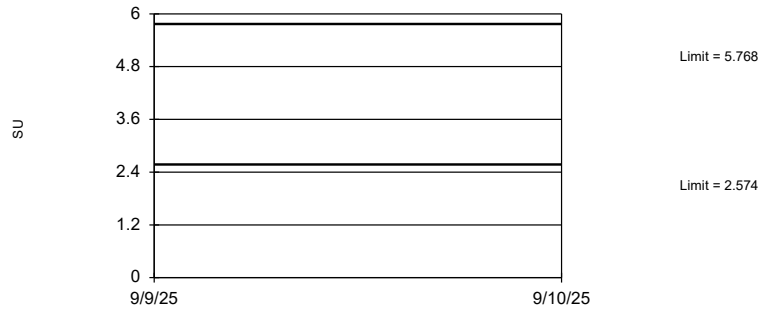
Prediction Limit
Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Chi Squared normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 110 background values. 26.36% NDs. Report alpha = 0.009009. Assumes 1 future value. Seasonality was not detected with 95% confidence.

Constituent: Fluoride Analysis Run 2/24/2026 2:46 PM
Northeastern Plant Client: AEP Data: 20260223_Pirkey_LF_Sanitas_V2

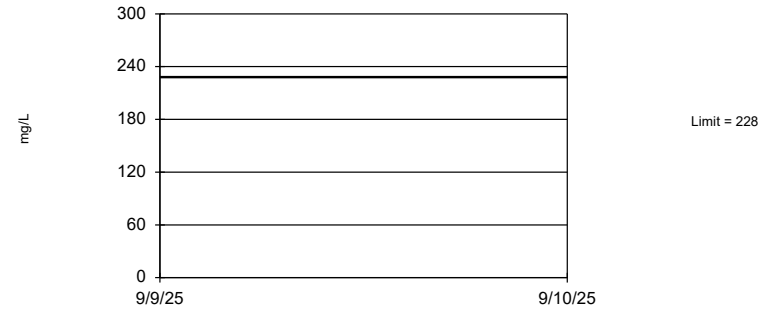
Prediction Limit Interwell Parametric



Background Data Summary: Mean=4.171, Std. Dev.=0.8022, n=111. Seasonality was not detected with 95% confidence. Normality test: Chi Squared @alpha = 0.05, calculated = 9.09, critical = 14.07. Report alpha = 0.05. Assumes 1 future value.

Constituent: pH Analysis Run 2/24/2026 2:46 PM
Northeastern Plant Client: AEP Data: 20260223_Pirkey_LF_Sanitas_V2

Prediction Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Chi Squared normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 111 background values. Report alpha = 0.008929. Assumes 1 future value. Seasonality was not detected with 95% confidence.

Constituent: Sulfate Analysis Run 2/24/2026 2:46 PM
Northeastern Plant Client: AEP Data: 20260223_Pirkey_LF_Sanitas_V2

Prediction Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Chi Squared normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 111 background values. 0.9009% NDs. Report alpha = 0.008929. Assumes 1 future value. Seasonality was not detected with 95% confidence.

Constituent: Total Dissolved Solids Analysis Run 2/24/2026 2:46 PM
Northeastern Plant Client: AEP Data: 20260223_Pirkey_LF_Sanitas_V2

ATTACHMENT C
*Analytical Data from Ground-Water Resources of
Harrison County, Texas*

TEXAS WATER DEVELOPMENT BOARD

REPORT 27

GROUND-WATER RESOURCES OF
HARRISON COUNTY, TEXAS

By

M. E. Broom and B. N. Myers
United States Geological Survey

Prepared by the U.S. Geological Survey
in cooperation with the
Texas Water Development Board
and the
Harrison County Commissioners Court

August 1966

Table 7.--Chemical analyses of water from wells and springs in Harrison County

(Analyses given are in parts per million except specific conductance, pH, percent sodium, sodium adsorption ratio, and residual sodium carbonate.)

Well	Depth of well (ft)	Date of collection	Silica (SiO ₂)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids	Hardness as CaCO ₃	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
LK-35-11-901	16	Jan. 29, 1942	--	--	--	6.8	17	*36	0.0	97	32	--	22	--	211	85	--	--	--	--	--
902	101	Oct. 20, 1964	43	10	--	21	14	*19	3	112	23	0.1	.0	--	233	110	28	0.8	0.00	337	5.0
19-301	39	Jan. 29, 1942	--	--	--	21	b/	*30	134	3	4.5	.2	g/	--	126	55	--	--	--	--	--
501	35	do	--	--	--	a/	b/	*22	12	10	16	--	26	--	85	16	--	--	--	--	--
601	32	do	--	--	--	15	15	*90	18	2	196	.1	g/	--	328	99	--	--	--	--	--
20-401	18	do	--	--	--	8.8	b/	*3.7	6	3	14	.2	g/	--	40	25	--	--	--	--	--
402	850	July 2, 1964	15	1.5	--	6.0	2.2	235 4.0	272	11	221	.4	3.8	0.29	633	24	95	21	3.98	1,160	7.4
† 403	583	July 6, 1964	14	3.4	--	6.2	2.3	394 4.1	288	.0	455	.3	2.8	.32	1,020	25	97	34	4.22	1,870	7.5
501	36	July 2, 1964	--	.01	--	--	--	--	25	--	6.1	--	--	--	30	--	--	--	.00	98	6.2
502	310	Oct. 21, 1964	10	.67	--	13	5.2	*345	312	.0	388	.6	.8	--	916	54	93	20	4.03	1,700	7.3
801	61	Jan. 29, 1942	--	--	--	6.0	4.4	*26	37	30	20	.3	g/	--	105	33	--	--	--	--	--
901	34	do	--	--	--	a/	b/	*13	6	10	12	--	g/	--	41	5	--	--	--	--	--
21-901	16	Jan. 30, 1942	--	--	--	a/	b/	*15	6	3	24	.1	g/	--	49	11	--	--	--	--	--
902	Spring	do	--	--	--	a/	b/	*8.7	12	2	4.5	.1	g/	--	22	0	--	--	--	--	--
22-403	260	Aug. 7, 1964	12	.08	0.04	4.0	1.7	125 2.2	274	54	8.8	.3	.0	.77	344	17	93	1.3	4.15	563	7.9
501	30	Feb. 11, 1942	--	--	--	a/	3.6	*4.4	18	2	3.0	.1	g/	--	29	17	--	--	--	--	--
504	365	Oct. 23, 1964	13	.26	--	2.5	.2	*123	282	30	9.0	.2	.2	--	317	7	97	20	4.48	506	7.9
505	45	Feb. 11, 1942	--	--	--	14	b/	*5.8	55	2	4.5	--	g/	--	55	41	--	--	--	--	--
601	17	do	--	--	--	a/	b/	*5.1	12	2	3.0	.1	g/	--	18	6	--	--	--	--	--
g/ 704	215	Sept. 16, 1964	17	--	--	28	10	*110	166	164	22	.4	3	--	436	111	--	--	--	691	7.5
705	215	June 22, 1964	23	.48	--	8.5	4.6	87 5.4	172	48	31	.1	5.8	.25	299	40	80	6.0	2.02	485	6.5
706	316	Dec. 30, 1960	13	--	--	1.0	.1	*146	235	98	18	.2	.0	--	392	3	99	37	--	651	8.1
706	316	June 22, 1964	13	.15	--	1.8	.1	150 1.7	240	107	19	.2	3.0	.31	414	5	98	29	3.83	672	7.8
707	200	do	17	.19	--	10	3.4	163 5.6	162	221	24	.1	9.8	.21	534	39	89	11	1.88	837	6.9
23-502	315	Oct. 27, 1941	--	--	--	a/	b/	*128	256	25	38	.4	g/	--	320	11	--	--	--	--	--
502	315	June 17, 1964	25	1.0	--	7.2	2.7	*115	232	32	37	.2	2.2	--	335	29	90	9.3	3.22	538	7.2
602	133	Feb. 21, 1942	--	--	--	6.8	3.6	*174	360	10	74	.1	g/	--	446	32	--	--	--	--	--

See footnotes at end of table.

Table 7.--Chemical analyses of water from wells and springs in Harrison County--Continued

Well	Depth of well (ft)	Date of collection	Silica (SiO ₂)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids	Hardness as CaCO ₃	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
LK-35-23-701	--	Oct. 28, 1941	--	--	--	a/	b/	*234	354	4	168	--	g/	--	587	22	--	--	--	--	--
801	430	Feb. 21, 1942	--	--	--	10	b/	*142	299	30	44	0.1	g/	--	375	31	--	--	--	--	--
801	430	July 17, 1964	13	0.16	0.01	7.2	1.9	144 2.0	307	21	47	.0	1.8	0.18	389	26	92	12	4.51	661	8.0
902	105	Oct. 27, 1941	--	--	--	24	20	*91	262	42	52	.2	g/	--	367	142	--	--	--	--	--
24-101	103	Oct. 28, 1941	--	--	--	a/	b/	*121	220	23	50	--	g/	--	305	11	--	--	--	--	--
401	103	Nov. 3, 1941	--	--	--	a/	b/	*108	201	31	34	.3	g/	--	275	11	--	--	--	--	--
701	36	Feb. 12, 1942	--	--	--	a/	4.9	*26	6	17	34	.2	g/	--	91	20	--	--	--	--	--
27-301	16	Jan. 29, 1942	--	--	--	a/	b/	*6.7	6	2	11	.1	g/	--	29	10	--	--	--	--	--
302	424	Oct. 21, 1964	6.8	2.1	--	4.2	1.1	*271	284	1.2	262	.3	.0	--	687	15	98	30	4.35	1,260	8.2
901	274	July 24, 1964	43	6.6	.04	48	3.0	42 3.7	215	41	9.3	.0	.8	.16	297	132	40	1.6	.88	443	7.4
28-101	25	Jan. 30, 1942	--	--	--	a/	b/	*12	12	3	8.0	.2	g/	--	32	0	--	--	--	--	--
102	200	Oct. 22, 1964	30	11	--	12	7.5	*31	105	27	10	.1	.2	--	170	61	53	1.7	.50	255	6.2
402	30	Jan. 28, 1942	--	--	--	a/	b/	*9.0	6	10	4.0	--	g/	--	32	5	--	--	--	--	--
802	242	June 12, 1964	10	.09	--	2.8	.7	*99	176	63	9.7	.1	2.5	--	275	10	96	14	2.69	448	7.8
803	205	Oct. 17, 1941	--	--	--	2.8	1.7	*114	156	105	17	--	0	--	331	14	--	--	--	--	--
803	205	June 12, 1964	11	.21	--	2.5	.9	*110	152	94	16	.1	4.0	--	314	10	96	15	2.29	507	7.6
804	245	do	10	.09	--	1.5	.5	*110	160	89	13	.1	3.8	--	307	6	98	20	2.51	495	7.5
902	250	Oct. 17, 1941	--	--	--	9.6	6.1	*59	98	69	18	.1	g/	--	210	49	--	--	--	--	--
903	272	do	--	--	--	14	7.3	*47	79	69	21	.3	g/	--	197	65	--	--	--	--	--
29-102	240	July 29, 1964	11	.32	.00	1.5	1.1	254 2.1	647	8.0	8.2	2.4	3.2	.61	610	8	98	39	10.4	992	8.1
103	590	do	13	.36	--	1.5	.6	229 1.2	511	36	40	.7	1.2	.57	575	6	99	41	8.26	955	8.2
201	600	do	13	.05	--	.5	.5	207 .9	408	52	47	.5	2.0	.56	525	3	99	52	6.63	875	8.1
301	37	Jan. 30, 1942	--	--	--	a/	b/	*17	6	26	8.0	.1	g/	--	56	7	--	--	--	--	--
401	23	Feb. 17, 1942	--	--	--	a/	b/	*4.4	6	8	5.0	.3	g/	--	24	12	--	--	--	--	--
501	30	Jan. 30, 1942	--	--	--	a/	6.1	*17	18	20	25	.2	g/	--	81	34	--	--	--	--	--
701	25	Jan. 28, 1942	--	--	--	a/	b/	*11	6	3	14	.1	g/	--	37	7	--	--	--	--	--
703	220	July 30, 1964	11	.12	.01	3.0	.9	*196	378	108	7.0	.7	3.2	--	516	11	97	26	5.98	822	8.0
802	30	Jan. 28, 1942	--	--	--	6.0	4.4	*22	0	10	24	--	50	--	116	33	--	--	--	--	--

See footnotes at end of table.

Table 7.--Chemical analyses of water from wells and springs in Harrison County--Continued

Well	Depth of well (ft)	Date of collection	Silica (SiO ₂)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dis-solved solids	Hardness as CaCO ₃	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
LK-35-29-902	444	Oct. 23, 1964	12	0.12	--	1.8	0.4	*246	564	62	7.9	1.1	0.2	--	608	6	99	44	9.14	968	8.3
903	315	Oct. 28, 1960	12	--	--	7.5	3.5	122 3.6	267	63	10	.4	2.5	--	356	33	88	9.2	--	574	7.5
904	410	Aug. 5, 1964	12	.12	0.01	.8	.0	170 1.1	417	23	4.1	.4	.2	0.53	417	2	99	52	6.79	681	8.2
906	248	Nov. 18, 1941	--	d/ 35	--	22	9.0	*11	0	23	64	--	e/	--	129	91	--	--	--	--	--
907	192	do	--	d/ 55	--	23	24	*45	0	50	182	0	e/	--	324	155	--	--	--	--	--
908	201	do	--	d/ 50	--	19	24	*84	0	88	185	--	e/	--	400	145	--	--	--	--	--
909	111	do	--	d/ 55	--	20	20	*46	0	81	208	--	e/	--	377	132	--	--	--	--	--
910	50	do	--	d/ 2.5	--	10	b/	*17	12	4	42	--	e/	--	82	37	--	--	--	--	--
911	128	do	--	d/ 15	--	20	13	*16	85	46	14	.2	e/	--	151	103	--	--	--	--	--
912	125	do	--	d/ 15	--	44	25	*5.3	116	100	16	--	e/	--	247	210	--	--	--	--	--
30-401	610	Nov. 17, 1941	--	--	--	10	5.4	*4.8	6	40	8.0	.2	e/	--	71	48	--	--	--	--	--
402	300	Nov. 12, 1941	--	--	--	a/	6.6	*16	24	42	7.0	.1	e/	--	88	39	--	--	--	--	--
e/ 403	300	Dec. --, 1944	31	2	.08	8	5	*22	18	53	12	f/	f/	--	144	41	--	f/	--	--	5.6
405	300	Nov. 12, 1941	--	--	--	10	5.4	*2.8	0	96	6.5	0	e/	--	121	48	--	--	--	--	--
e/ 405	300	Dec. --, 1944	32	4.1	.07	7	4	*7	0	55	11	f/	f/	--	108	34	--	f/	--	--	4.0
406	240	Nov. 12, 1941	--	--	--	7.6	9.0	*2.5	31	26	6.5	.2	e/	--	67	56	--	--	--	--	--
e/ 406	240	Dec. --, 1944	30	2.3	g/	9	9	*5	24	34	11	.4	f/	--	100	60	--	f/	--	--	6.3
e/ 408	479	July 22, 1940	29	.6	.1	43	9	*84	201	112	32	--	2.2	--	400	145	--	f/	--	--	7.4
408	479	Nov. 12, 1941	--	--	--	6	11	*109	195	103	20	0	e/	--	345	62	--	--	--	--	--
e/ 408	479	Dec. --, 1944	24	1.1	.13	40	9	*79	199	111	21	.44	1.8	--	407	137	--	f/	--	--	7.6
701	323	Nov. 18, 1941	--	--	--	104	9	*23	275	100	12	.3	e/	--	383	296	--	--	--	--	--
702	351	Nov. 13, 1941	--	--	--	15	b/	*100	189	77	16	.2	e/	--	302	40	--	--	--	--	--
e/ 702	351	Dec. --, 1944	14	.04	h/	12	3	*104	201	71	21	.5	f/	--	305	43	--	f/	--	--	7.8
e/ 703	375	July 22, 1940	24	.4	--	32	9	*90	195	94	39	f/	f/	--	370	117	--	f/	--	--	7.2
703	375	Nov. 12, 1941	--	--	--	10	3.9	*89	165	77	15	.2	e/	--	276	42	--	--	--	--	--
e/ 703	375	Dec. --, 1944	24	.14	.08	33	7	*73	189	75	27	.4	f/	--	308	112	--	f/	--	--	7.9
704	473	Nov. 12, 1941	--	--	--	18	b/	*103	177	100	18	.1	e/	--	328	51	--	--	--	--	--
e/ 704	473	Dec. --, 1944	22	.14	.09	27	6	*95	195	100	25	.4	f/	--	380	92	--	f/	--	--	7.9

See footnotes at end of table.

Table 7.--Chemical analyses of water from wells and springs in Harrison County--Continued

Well	Depth of well (ft)	Date of collection	Silica (SiO ₂)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dis-solved solids	Hardness as CaCO ₃	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
LK-35-30-803	24	Feb. 17, 1942	--	--	--	13	36	*36	12	146	69	0.1	g/	--	308	183	--	--	--	--	--
804	364	Oct. 23, 1964	22	1.4	--	21	7.2	*60	152	26	42	.2	1.8	--	255	82	61	2.9	0.85	421	7.1
901	31	Feb. 9, 1942	--	--	--	a/	6.1	*5.1	37	3	4	.1	g/	--	39	29	--	--	--	--	--
31-302	205	Feb. 14, 1942	--	--	--	a/	4.9	*11	49	2	1	.4	g/	--	53	20	--	--	--	--	--
601	17	Feb. 12, 1942	--	--	--	118	56	*108	232	2	401	.3	g/	--	800	525	--	--	--	--	--
701	28	Feb. 9, 1942	--	--	--	a/	b/	*18	12	17	20	--	g/	--	76	22	--	--	--	--	--
702	411	June 22, 1964	50	59	--	44	42	52 5.8	0	106	217	.1	.8	0.03	518	282	27	1.3	.00	931	4.0
703	792	Dec. 30, 1960	15	--	--	16	4.7	83 3.3	221	23	24	.2	3.0	--	281	59	74	4.7	--	464	7.4
703	792	July 10, 1964	17	.23	--	16	4.4	80 3.2	217	24	23	.2	4.8	.18	280	58	74	4.6	2.40	467	7.5
708	27	Feb. 9, 1942	--	--	--	a/	b/	*10	6	2	8.5	--	g/	--	46	12	--	--	--	--	--
709	415	June 22, 1964	14	.04	--	2.0	.2	141 1.5	316	3.2	38	.3	2.5	.34	358	6	97	25	5.06	607	8.0
801	19	Feb. 12, 1942	--	--	--	a/	11	*81	31	20	129	.2	g/	--	259	52	--	--	--	--	--
32-501	18	do	--	--	--	23	6	*14	85	11	9.5	.1	g/	--	104	67	--	--	--	--	--
35-201	304	Nov. 4, 1941	--	--	--	a/	b/	*79	165	46	7.5	.4	g/	--	220	22	--	--	--	--	--
601	450	July 24, 1964	8.1	1.1	0.00	4.5	1.7	686 3.1	564	1.8	760	--	.8	.49	1,740	18	99	70	8.88	3,170	7.7
604	500	do	12	.70	.01	4.5	1.5	447 2.3	664	4.8	305	1.4	4.2	.55	1,110	17	98	47	10.5	1,930	7.9
36-101	35	Jan. 27, 1942	--	--	--	a/	b/	*40	18	60	14	--	g/	--	129	12	--	--	--	--	--
201	32	do	--	--	--	a/	b/	*10	12	2	3.5	--	g/	--	32	3	--	--	--	--	--
202	26	do	--	--	--	6.0	7.1	*86	6	2	88	1.2	120	--	313	44	--	--	--	--	--
301	20	Jan. 28, 1942	--	--	--	a/	b/	*12	12	3	12	.1	g/	--	37	5	--	--	--	--	--
401	27	Nov. 4, 1941	--	--	--	a/	b/	*3.9	6	7	5.0	--	g/	--	22	11	--	--	--	--	--
501	28	Jan. 27, 1942	--	--	--	a/	3.6	*3.5	6	2	5.5	--	g/	--	30	17	--	--	--	--	--
601	220	July 28, 1964	12	.14	.01	3.0	.9	187 1.9	456	29	13	.5	2.5	.65	474	11	97	25	7.25	779	8.0
701	18	Jan. 27, 1942	--	--	--	17	13	*44	18	10	91	--	50	--	234	98	--	--	--	--	--
901	--	Nov. 14, 1941	--	--	--	a/	b/	*291	695	3	44	--	g/	--	684	2	--	--	--	--	--
37-101	465	Jan. 28, 1942	--	--	--	a/	b/	*2.1	6	2	7.5	.1	g/	--	25	17	--	--	--	--	--
401	22	do	--	--	--	a/	b/	*6.9	6	2	3.0	.1	g/	--	20	0	--	--	--	--	--
402	370	Aug. 3, 1964	17	--	--	3.0	1.1	*238	606	.8	20	1.6	.5	--	580	12	98	30	9.69	940	7.7

See footnotes at end of table.

Table 7.--Chemical analyses of water from wells and springs in Harrison County--Continued

Well	Depth of well (ft)	Date of collection	Silica (SiO ₂)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids	Hardness as CaCO ₃	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
LK-35-37-601	6	Feb. 14, 1942	--	--	--	130	83	*143	0	899	101	0.8	<u>g</u>	--	1,361	666	--	--	--	--	--
	701	Nov. 4, 1941	--	--	--	<u>a</u>	6.6	*6.2	24	2	18	--	<u>g</u>	--	48	34	--	--	--	--	--
	801	Aug. 3, 1964	12	0.09	--	2.5	1.0	*301	723	.6	46	2.4	0.2	--	722	10	98	41	11.6	1,200	8.1
	802	do	13	.07	0.00	.8	.5	283 1.1	608	.2	63	1.3	2.2	1.0	685	4	99	62	8.89	1,150	8.5
	803	do	12	.1	--	.8	.7	*272	629	3.4	52	1.2	.8	--	652	5	99	53	10.2	1,100	8.2
38-101	43	Feb. 17, 1942	--	--	--	23	3.6	*25	122	15	7.0	--	<u>g</u>	--	134	72	--	--	--	--	--
	602	Feb. 13, 1942	--	--	--	<u>a</u>	<u>b</u>	*115	262	10	28	.1	<u>g</u>	--	289	17	--	--	--	--	--
	603	Nov. 4, 1941	--	--	--	<u>a</u>	<u>b</u>	*186	415	5	50	.3	<u>g</u>	--	448	12	--	--	--	--	--
	701	do	--	--	--	52	39	*35	372	2	41	--	<u>g</u>	--	352	289	--	--	--	--	--
	801	Nov. 14, 1941	--	--	--	128	155	*364	756	238	620	.1	<u>g</u>	--	1,883	956	--	--	--	--	--
	802	do	--	--	--	31	15	*174	519	12	57	--	<u>g</u>	--	544	139	--	--	--	--	--
	803	do	--	--	--	30	<u>b</u>	*118	153	7	148	.8	<u>g</u>	--	389	87	--	--	--	--	--
	804	do	--	--	--	<u>a</u>	<u>b</u>	*173	433	4	24	--	<u>g</u>	--	419	17	--	--	--	--	--
39-201	33	Feb. 13, 1942	--	--	--	<u>a</u>	<u>b</u>	4.8	12	4	4.5	.1	<u>g</u>	--	25	12	--	--	--	--	--
	301	July 13, 1964	--	.62	--	--	--	--	348	--	40	--	--	--	--	100	--	--	3.70	694	7.4
	304	Oct. 6, 1964	23	2.2	--	20	8.3	*100	290	6.0	40	.2	.0	--	341	84	72	4.7	3.07	610	6.9
	401	Feb. 17, 1942	--	--	--	20	18	*140	67	67	127	.2	156	--	561	126	--	--	--	--	--
	605	Oct. 6, 1964	11	.05	--	1.5	.4	*169	362	28	33	.2	.2	--	421	5	99	33	5.83	641	7.8
	801	Aug. 11, 1964	57	3.8	--	18	3.9	*15	108	.0	2.7	.2	.0	--	150	61	34	.8	.55	181	6.4
	902	do	62	6.3	--	11	4.5	*26	102	.2	13	.2	.0	--	167	46	55	1.7	.75	210	6.4
40-101	205	July 10, 1964	11	.04	--	2.0	.7	179 1.1	368	5.8	60	.2	5.0	.45	447	8	98	28	5.87	752	8.0
	102	Oct. 20, 1964	11	.06	--	4.5	1.7	*197	396	.8	85	.3	.0	--	495	18	96	20	6.13	845	8.0
	201	July 10, 1964	11	.66	--	13	3.8	304 2.1	396	200	132	.2	.2	.50	862	48	93	19	5.53	1,400	7.9
	204	Oct. 29, 1941	--	--	--	16	16	*172	262	77	130	--	<u>g</u>	--	540	105	--	--	--	--	--
	204	June 18, 1964	14	1.3	--	32	9.7	*178	272	78	143	.1	.0	--	589	120	76	7.1	2.06	1,000	7.4
	206	do	15	.05	--	30	10	*294	256	136	282	.1	5.6	--	899	116	85	12	1.88	1,530	7.9
	207	Oct. 31, 1941	--	--	--	13	15	*177	293	77	112	--	--	--	538	94	--	--	--	--	--
	401	Feb. 13, 1942	--	--	--	<u>a</u>	<u>b</u>	*18	12	23	7.5	.1	<u>g</u>	--	58	6	--	--	--	--	--

See footnotes at end of table.

Table 7.--Chemical analyses of water from wells and springs in Harrison County--Continued

Well	Depth of well (ft)	Date of collection	Silica (SiO ₂)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids	Hardness as CaCO ₃	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
LK-35-40-402	190	Oct. 6, 1964	19	0.64	--	43	12	*130	328	115	35	0.2	1.8	--	517	157	64	4.5	2.24	812	7.1
501	22	Feb. 13, 1942	--	--	--	8.4	b/	*45	92	10	24	.9	c/	--	136	26	--	--	--	--	--
502	158	Oct. 20, 1964	3.5	1.2	--	10	59	*492	622	.2	585	.1	1.0	--	1,460	268	80	13	4.85	2,550	8.8
704	25	Feb. 13, 1942	--	--	--	10	7.3	*84	37	8	141	--	c/	--	268	55	--	--	--	--	--
46-202	147	Nov. 14, 1941	--	--	--	7.6	b/	*119	317	8	12	.3	c/	--	304	26	--	--	--	--	--
47-201	310	Aug. 11, 1964	34	.46	0.02	2.0	.5	103 1.0	246	.0	24	.1	.0	0.11	286	7	96	17	3.89	443	7.8

* Sodium and potassium calculated as sodium (Na).

† Well 35-20-403 Phosphate (PO₄), 0.17.

a/ Less than 5 ppm.

b/ Less than 3 ppm.

c/ Less than 20 ppm.

d/ Iron determination on same date by Atlas Chemical Industries, Inc.

e/ Analyses by Texas State Dept. of Health.

f/ Less than 0.4 ppm.

g/ Less than 0.05 ppm.

ATTACHMENT D
Pirkey Landfill Leachate Laboratory Analytical
Reports for February 2023 and November 2025



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Job ID: 230659

Customer: Pirkey Power Station

Date Reported: 04/06/2023

Customer Sample ID: EBAP

Customer Description: TG-32

Lab Number: 230659-003

Preparation:

Date Collected: 03/01/2023 00:23 EST

Date Received: 03/02/2023 10:30 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.59	mg/L	5	0.25	0.05		CRJ	03/16/2023 13:42	EPA 300.1 -1997, Rev. 1.0
Chloride	84.5	mg/L	5	0.10	0.05		CRJ	03/16/2023 13:42	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.56	mg/L	5	0.15	0.05		CRJ	03/16/2023 13:42	EPA 300.1 -1997, Rev. 1.0
Sulfate	2780	mg/L	100	20	3		CRJ	03/16/2023 19:11	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	03/03/2023 11:26	SM 2320B-2011
TDS, Filterable Residue	3900	mg/L	20	1000	400		SDW	03/07/2023 10:50	SM 2540C-2015

Customer Sample ID: Leachate

Customer Description: TG-32

Lab Number: 230659-004

Preparation:

Date Collected: 02/28/2023 10:55 EST

Date Received: 03/02/2023 10:30 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	1.82	mg/L	5	0.25	0.05		CRJ	03/16/2023 14:15	EPA 300.1 -1997, Rev. 1.0
Chloride	41.7	mg/L	5	0.10	0.05		CRJ	03/16/2023 14:15	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.47	mg/L	5	0.15	0.05		CRJ	03/16/2023 14:15	EPA 300.1 -1997, Rev. 1.0
Sulfate	329	mg/L	50	10	2		CRJ	03/16/2023 21:23	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	94	mg/L	1	20	5		MGK	03/03/2023 11:26	SM 2320B-2011
TDS, Filterable Residue	600	mg/L	20	1000	400	J1	SDW	03/03/2023 12:09	SM 2540C-2015



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Reissued

Job ID: 230701

Customer: Pirkey Power Station

Date Reported: 10/28/2023

Customer Sample ID: Leachate

Customer Description:

Lab Number: 230701-004

Preparation:

Date Collected: 02/28/2023 10:55 EST

Date Received: 03/06/2023 14:20 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4
Arsenic	2.22	µg/L	1	0.10	0.03		GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4
Barium	685	µg/L	1	0.20	0.05		GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4
Beryllium	1.16	µg/L	1	0.050	0.007		GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4
Boron	2.37	mg/L	1	0.050	0.009		GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4
Cadmium	0.148	µg/L	1	0.020	0.004		GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4
Calcium	50.9	mg/L	1	0.05	0.02		GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4
Chromium	0.36	µg/L	1	0.20	0.04		GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4
Cobalt	35.6	µg/L	1	0.020	0.003		GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4
Lead	0.50	µg/L	1	0.20	0.05		GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4
Lithium	0.0352	mg/L	1	0.00020	0.00005		GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4
Magnesium	27.0	mg/L	1	0.10	0.02		GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4
Molybdenum	0.8	µg/L	1	0.5	0.1		GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4
Potassium	3.11	mg/L	1	0.10	0.02		GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4
Selenium	4.16	µg/L	1	0.50	0.09		GES	03/15/2023 19:02	EPA 200.8-1994, Rev. 5.4
Sodium	52.9	mg/L	1	0.20	0.05		GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4
Strontium	1.25	mg/L	1	0.0020	0.0004		GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4
Thallium	0.12	µg/L	1	0.20	0.04	J1	GES	03/08/2023 13:10	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Reissued

Job ID: 252978

Customer: Pirkey Power Station

Date Reported: 12/22/2025

Customer Sample ID: Leachate

Customer Description:

Lab Number: 252978-001

Preparation:

Date Collected: 11/17/2025 10:03 EST

Date Received: 11/20/2025 10:30 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	562	mg/L	50	1.5	0.5		JCF	11/21/2025 12:24	EPA 300.1 -1997, Rev. 1.0
Sulfate	2130	mg/L	50	15	1		JCF	11/21/2025 12:24	EPA 300.1 -1997, Rev. 1.0

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Calcium	761	mg/L	50	5	1	Q5, M1	GES	12/02/2025 17:59	EPA 200.8-1994, Rev. 5.4
Magnesium	17.6	mg/L	50	5.0	0.5	Q5, M1	GES	12/02/2025 17:59	EPA 200.8-1994, Rev. 5.4
Potassium	127	mg/L	50	5	1	Q5, M1	GES	12/02/2025 17:59	EPA 200.8-1994, Rev. 5.4
Sodium	706	mg/L	50	10	1	Q5, M1	GES	12/02/2025 17:59	EPA 200.8-1994, Rev. 5.4

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	411	mg/L	1	20	5		MGK	11/24/2025 09:36	SM 2320B-2021
Bicarbonate Alkalinity	347	mg/L	1	20	5	Q14	MGK	11/24/2025 09:36	SM 4500 C02D-2011

Customer Sample ID: Brine Pond

Customer Description:

Lab Number: 252978-002

Preparation:

Date Collected: 11/17/2025 10:26 EST

Date Received: 11/20/2025 10:30 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	1230	mg/L	500	15	5		JCF	11/21/2025 13:32	EPA 300.1 -1997, Rev. 1.0
Sulfate	11700	mg/L	500	150	10		JCF	11/21/2025 13:32	EPA 300.1 -1997, Rev. 1.0

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Calcium	241	mg/L	50	5	1	Q5, M1	GES	12/02/2025 18:16	EPA 200.8-1994, Rev. 5.4
Magnesium	145	mg/L	50	5.0	0.5	Q5, M1	GES	12/02/2025 18:16	EPA 200.8-1994, Rev. 5.4
Potassium	241	mg/L	50	5	1	Q5, M1	GES	12/02/2025 18:16	EPA 200.8-1994, Rev. 5.4
Sodium	5710	mg/L	50	10	1	Q5, M1	GES	12/02/2025 18:16	EPA 200.8-1994, Rev. 5.4

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	366	mg/L	1	20	5		MGK	11/24/2025 09:36	SM 2320B-2021
Bicarbonate Alkalinity	331	mg/L	1	20	5	Q14	MGK	11/24/2025 09:36	SM 4500 C02D-2011



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Reissued

Job ID: 252978

Customer: Pirkey Power Station

Date Reported: 12/22/2025

Customer Sample ID: AD-23

Customer Description:

Lab Number: 252978-003

Preparation:

Date Collected: 11/17/2025 11:32 EST

Date Received: 11/20/2025 10:30 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Chloride	10.6	mg/L	2	0.06	0.02		JCF	11/21/2025 14:18	EPA 300.1 -1997, Rev. 1.0

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Boron	0.343	mg/L	1	0.050	0.006		GES	12/03/2025 14:59	EPA 200.8-1994, Rev. 5.4

Customer Sample ID: AD-36

Customer Description:

Lab Number: 252978-004

Preparation:

Date Collected: 11/17/2025 10:51 EST

Date Received: 11/20/2025 10:30 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.84	mg/L	2	0.10	0.02		JCF	11/21/2025 14:41	EPA 300.1 -1997, Rev. 1.0
Chloride	19.5	mg/L	2	0.06	0.02		JCF	11/21/2025 14:41	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.10	mg/L	2	0.06	0.02		JCF	11/21/2025 14:41	EPA 300.1 -1997, Rev. 1.0
Sulfate	3.75	mg/L	2	0.60	0.04		JCF	11/21/2025 14:41	EPA 300.1 -1997, Rev. 1.0

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Boron	0.114	mg/L	1	0.050	0.006		GES	12/03/2025 15:15	EPA 200.8-1994, Rev. 5.4
Calcium	1.20	mg/L	1	0.10	0.02		GES	12/03/2025 15:15	EPA 200.8-1994, Rev. 5.4

252978

Job Comments:

Original report issued 12/9/25. Report reissued 12/22/25 with boron added to 252978-004.



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
Audinet: 210-4221

Reissued

Job ID: 252978

Customer: Pirkey Power Station

Date Reported: 12/22/2025

Report Verification

This report and the above data have been confirmed by the following analyst.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

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THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.

Data Qualifier Legend

Q5 - Sample was received with improper chemical preservation.

M1 - The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.

Q14 - This analyte and method are not included on the primary Laboratory Scope of TNI Accreditation.

ATTACHMENT E
Certification by a Qualified Professional Engineer

CERTIFICATION BY A QUALIFIED PROFESSIONAL ENGINEER

I certify that the above described alternative source demonstration is appropriate for evaluating the groundwater monitoring data for the CCR management area of the Pirkey Landfill and that the requirements of 30 TAC §352.941(c)(2) have been met.

Beth Ann Gross

Printed Name of Licensed Professional Engineer

Beth Ann Gross

Signature



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Texas Registered Engineering Firm
No. F-1182

79864
License Number

Texas
Licensing State

March 26, 2026
Date