Haley Griffith (adpce.ad)

From: Andrew Pruitt <apruitt@olsson.com>
Sent: Monday, November 10, 2025 3:48 PM
To: EE GW Reports
Cc: Melissa Vaught; Angela Sparks; David Passmore
Subject: Alternate Source Demonstration for First Half 2025 SSIs, Craighead County Legacy Class 1 Landfill, Permit No. 0254-S1-R5
Attachments: 25-11-10_ENV_TM DEQ 1H2025 ASD for SSIs Craighead County Landfill.pdf

Good afternoon. On behalf of the Craighead County Legacy Landfill, please find the attached alternate source demonstration for statistically significant increases identified during the first half 2025 monitoring period.

Please contact me or Melissa Vaught if you have any questions with this submittal.

Thank you,

Andrew Pruitt, P.G.
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MEMO

To:	Arkansas Department of Energy and Environment, Department of Environmental Quality Attn: Groundwater Branch Manager 5301 Northshore Drive North Little Rock, AR 72116
From:	Andrew Pruitt, PG and Melissa Vaught, PE
RE:	Alternate Source Demonstration for Statistically Significant Increases First Half of 2025 Monitoring Period, Craighead County Class 1 Landfill Permit No. 0254-S1-R5, AFIN: 16-00199
Date:	November 10, 2025
Project #:	A24-01259

On behalf of the Craighead County Solid Waste Disposal Authority, Olsson is submitting this alternate source demonstration (ASD) to the Arkansas Department of Energy and Environment, Division of Environmental Quality (DEQ) for confirmed statistically significant increases (SSIs) identified during the first half of 2025 groundwater monitoring period for the Craighead County Class 1 Landfill.

As reported in the first half of 2025 groundwater monitoring report (posted to the DEQ database dated August 14, 2025), confirmed SSIs were identified for arsenic, barium, and iron at background well MW-22, iron at background well MW-14R, TDS at background well MW-17R, and 1,1-dichloroethane (1,1-DCA) at MW-20R. A potentiometric surface map showing the locations of these wells relative to the direction of groundwater flow and the landfill is shown in Figure 1 (Attachment 1). The measured values of the confirmed SSIs identified are summarized in Table 1 (Attachment 2). Analytical results for sampling performed during the first half of 2025 were submitted to DEQ directly from Pace Analytical National of Mt. Juliet, Tennessee (posted to the DEQ database dated August 14, 2025).

Pursuant to Title 8 of the Code of Arkansas Rules Part 60 (8 CAR 60) §60.1204(c)(3), this memorandum presents evidence for an alternate source demonstration (ASD) that the SSIs are due to a source other than the landfill, the result of offsite influence, and/or natural fluctuations in groundwater quality.

ASD for MW-14R, MW-17R, and MW-22

The SSIs for arsenic, barium and iron at MW-22, iron at MW-14R, and TDS at MW-17R, as summarized in Table 1 (Attachment 2), were detected at groundwater wells which monitor background water quality due to their hydraulically upgradient position relative to the landfill as shown on Figure 1. As such, the SSIs for arsenic, barium and iron at MW-22, iron at MW-14R, and TDS at MW-17R are the result of natural fluctuations in groundwater quality and/or off-site influence.

ASD for MW-20R

The SSI for 1,1-DCA at MW-20R was previously confirmed and has DEQ-approved ASDs on record, as summarized in Table 2 (Attachment 2). The parameter was again measured above the laboratory reporting detection limit (RDL) at MW-20R during the first half of 2025 detection monitoring event. Due to previous detections, no verification sampling was performed.

As described in prior submittals, landfill leachate concentrations for 1,1 DCA are similar or lower than the levels measured in groundwater at MW-20R, with the majority of landfill leachate samples reported as non-detect for this parameter as shown in Table 3 (Attachment 2). Given the dilution effect of groundwater and the absence of any common leachate-indicating parameters (e.g., elevated chloride), it is highly unlikely that landfill leachate is the source for this constitute in groundwater at MW-20R.

Lastly, the major ion composition of leachate and groundwater samples collected during May 2025 was evaluated using the Stiff and Piper diagrams included in Attachment 3. If groundwater has been impacted by landfill leachate, the relative proportions of major ions in groundwater will resemble those in leachate.

A review of the Stiff diagrams shows that the ionic distribution in groundwater at MW-20R is similar to the ionic distributions at background wells MW-14R, MW-17R, and MW-22. In contrast, the leachate diagrams are distinctly different. The Piper diagram also illustrates the dissimilarity of groundwater quality to leachate, with data for all groundwater samples clustered closely together and positioned apart from the leachate data. Specifically, groundwater from MW-20R and the other wells are a calcium bicarbonate-type water, whereas leachate plots in the quadrants for sodium bicarbonate and sodium chloride-type waters. If leachate was mixing with groundwater at MW-20R then data from the well would plot at an intermediate distance between the leachate data and the data from background wells on the Piper diagram.

The Stiff and Piper diagrams show that the relative proportions of major ions in groundwater at all wells, including downgradient MW-20R, are different than landfill leachate. This provides a key line of evidence that the SSI for 1,1-DCA at MW-20R is not due to a release from the landfill.

CONCLUSIONS

In consideration of the information presented in this memorandum, Olsson concludes that:

- The SSIs for arsenic, barium, and iron at background well MW-22, iron at background well MW-14R, and TDS at background well MW-17R are the result of offsite influence and/or natural fluctuations in groundwater quality.
- Given the dilution effects of groundwater and the absence of any common leachate-indicating parameters (e.g., elevated chloride), it is highly unlikely that the concentrations of 1,1-DCA measured in groundwater at MW-20R are attributed to a release of landfill leachate, which has concentrations that are similar or below levels measured at MW-20R. The major ion composition of groundwater at MW-20R is similar to hydraulically upgradient groundwater and shows no evidence of impact from landfill leachate.

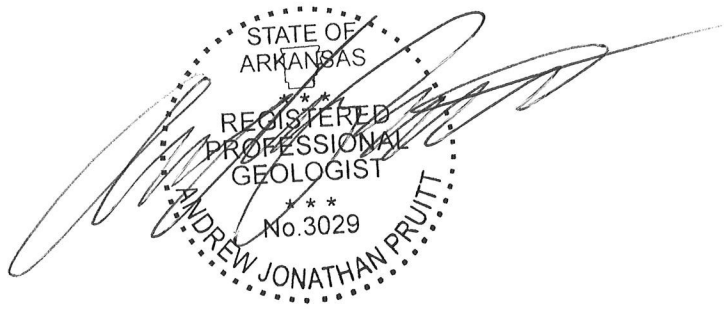
This memorandum serves as the ASD prepared in accordance with §60.1204(c)(3) and supports the position that the confirmed SSIs for arsenic, barium and iron at background well MW-22, iron at background well MW-14R, TDS at background well MW-17R, and 1,1-DCA at MW-20R identified during the first half of 2025 are not due to a release from the landfill. Therefore, it is recommended that the landfill continue with detection monitoring in accordance with 8 CAR 60 and the landfill's permit.

If you have questions or comments regarding this memorandum, please do not hesitate to contact Melissa Vaught, PE, at (479) 443-3404 or Andrew Pruitt, PG at (501) 225-7779.

Attachments

PROFESSIONAL GEOLOGIST'S CERTIFICATION

With this certification, I certify that I am an Arkansas-registered professional geologist and a qualified groundwater scientist as defined in Arkansas Pollution Control and Ecology Commission Rule Title 8 of the Code of Arkansas Rules (CAR) Part 60 (8 CAR Part 60), §60.1201(f), that this letter has been prepared under my direction, that the findings are accurate to the best of my knowledge, and that the alternate source demonstration described herein meets the requirements of §60.1204(c)(3) of 8 CAR Part 60.



Andrew J. Pruitt, Arkansas PG #3029

11/10/2025

Date

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ATTACHMENT 1
FIGURE



NOTE:

1. MW-17R IS SCREENED IN THE TERTIARY-AGE SEDIMENTS OF THE CLAIBORNE GROUP AND EXCLUDED FROM THE POTENTIOMETRIC SURFACE MAP. ALL OTHER MONITORING WELLS ARE SCREENED IN QUATERNARY-AGE ALLUVIAL DEPOSITS.

F:\2024\01001-01500\024-01259-A\40-Design\Exhibits\1H2025 CCLF REPORT\024-01259-A 1H2025 CCF REPORT FIGURE 2.dwg
DATE: Jun 04, 2025 12:25pm USER: jtorres

PROJECT NO:	024-01259-A
DRAWN BY:	JT
DATE:	05.29.2025

Figure 1. Potentiometric Surface, May 5, 2025.

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ATTACHMENT 2
TABLES

Table 1. Summary of SSIs, first half of 2025.

Well ID	Parameter	Prediction Limit (mg/L)	May 2025 Sampling Result (mg/L)	July 2025 Verification Result (mg/L)	SSI Confirmed?
MW-22 (upgradient)	Arsenic	0.004143	0.00974	0.00552	Yes
MW-22 (upgradient)	Barium	0.06761	0.0891[a]	0.0719	Yes
MW-14R (upgradient)	Iron	6.578	12.1	N/A[b]	Yes[b]
MW-22 (upgradient)	Iron	1.508	4.63	2.16	Yes
MW-17R (upgradient)	TDS	387.5	441 B	N/A[b]	Yes[b]
MW-20R	1,1-dichloroethane	Not applicable	0.00171	Not sampled	Yes[c]

Notes: “B” flag indicates the parameter was found in the associated quality control blank.

a. Value shown is the result of a laboratory re-run of the sample for verification purposes.
b. SSI was previously confirmed; verification sampling was not performed.
c. SSI was previously confirmed based on the double quantification rule.

Table 2. Summary of previously submitted and approved ASDs for confirmed SSIs.

Parameter	Well	Monitoring Period	ASD Submittal		ASD Approval	
			Date	DIN	Date	DIN
Arsenic	MW-22 (upgradient)	2H2024	5/2/2025	N/A**	---*	---*
Iron	MW-14R (upgradient)	1H2016	10/19/2016	70470	1/25/2017	70892
		2H2016	6/30/2017	72108	9/25/2017	72563
		1H2017	11/1/2017	72776	11/22/2017	72838
		2H2017	5/4/2018	73764	6/29/2018	74073
		1H2018	11/2/2018	74831	11/19/2018	74915
		2H2018	4/1/2019	75938	4/9/2019	76023
		1H2019	11/1/2019	77243	11/13/2019	77284
		2H2019	2/28/2020	77847	7/8/2020	78553
		1H2020	11/3/2020	79164	1/21/2021	79515
		2H2020	3/2/2021	79688	9/11/2023	84590
		1H2021	8/23/2021	80741	9/11/2023	84591
		2H2021	4/19/2022	81846	9/11/2023	84591
		1H2022	10/7/2022	82795	9/11/2023	84592
		2H2022	5/3/2023	83964	9/11/2023	84592
		1H2023	9/18/2023	84649	---*	---*
		2H2023	4/3/2024	85333	---*	---*
TDS	MW-17R (upgradient)	1H2019	11/1/2019	77243	11/13/2019	77284
		2H2020	3/2/2021	79688	9/11/2023	84590
		2H2021	4/19/2022	81846	9/11/2023	84591
		1H2022	10/7/2022	82795	9/11/2023	84592
		2H2022	5/3/2023	83964	9/11/2023	84592
		1H2023	9/18/2023	84649	---*	---*
		2H2023	4/3/2024	85333	---*	---*
		2H2024	5/2/2025	N/A**	---*	---*
1,1 DCA	MW-20R	1H2021	8/23/2021	80741	9/11/2023	84591
		2H2021	4/19/2022	81846	9/11/2023	84591
		1H2022	10/7/2022	82795	9/11/2023	84592
		2H2022	5/3/2023	83964	9/11/2023	84592
		1H2023	9/18/2023	84649	---*	---*
		2H2023	4/3/2024	85333	---*	---*
		1H2024	11/8/2024	N/A**	---*	---*

* No response to this submittal received from DEQ as of the date of this memo.
** DEQ database no longer uses DINs. Submission entered in DEQ database on date listed.

Table 3. Summary of 1,1 DCA levels in leachate and groundwater from MW-20R.

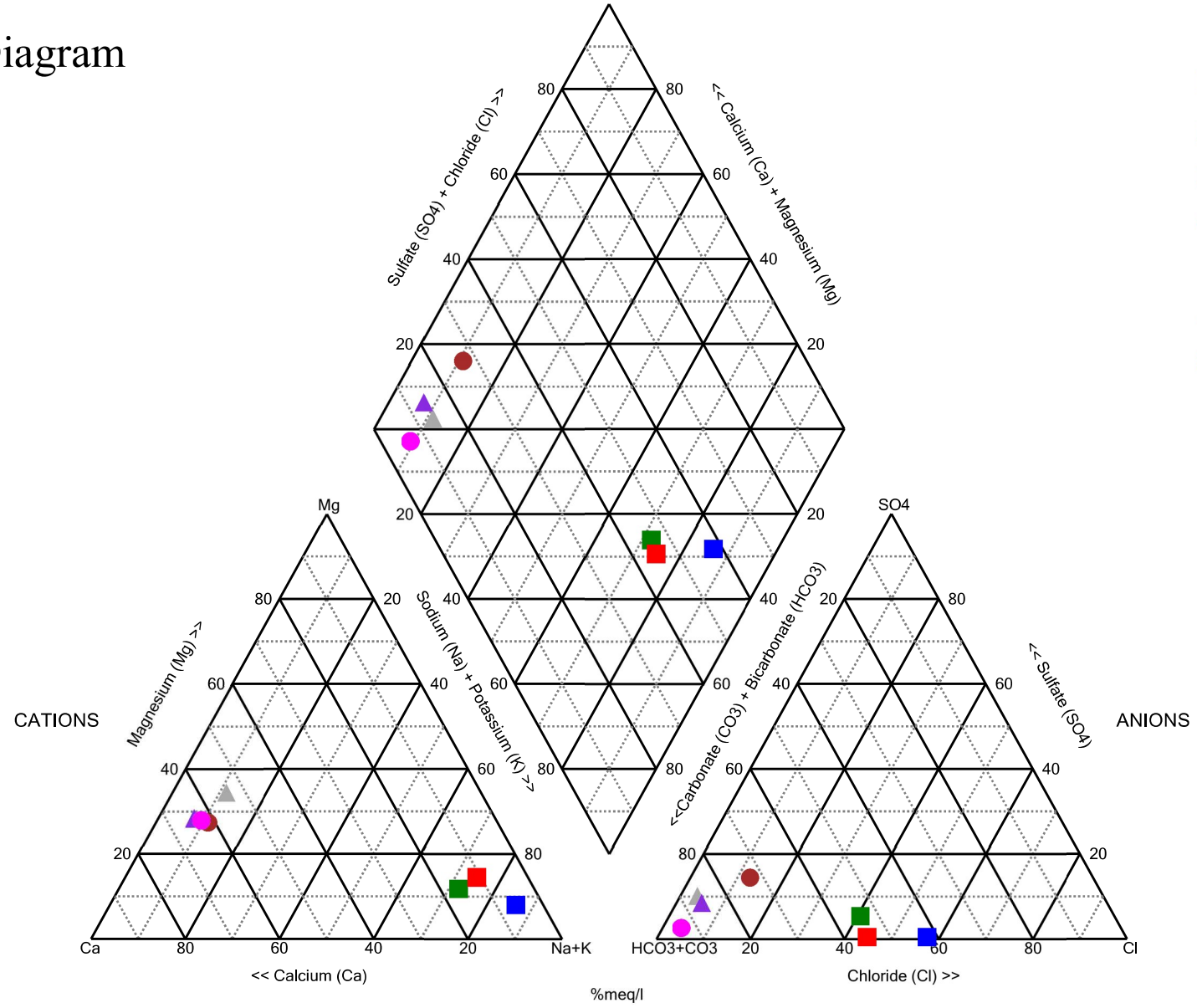
Parameter	Sample ID	Monitoring Event										
		1H2021	1H2021 Verification	2H2021	2H2021 Verification	1H2022	2H2022	1H2023	2H2023	1H2024	2H2024	1H2025
1,1-DCA (mg/L)	MW-20R	0.00196	0.0015	0.00179	0.00191	0.00195	0.00142	0.0023	0.00144	0.00215	0.000688 (J)	0.00171
	Leachate Building A	<0.005	n/a	<0.001	n/a	<0.01	<0.01	<0.001	<0.001	<0.001	<0.1	<0.01
	Leachate Building B	0.000724 (J)	n/a	0.000365 (J)	n/a	0.000434 (J)	0.000307 (J)	<0.001	0.000242 (J)	<0.001	<0.001	0.000146 (J)
	Leachate Building C	<0.005	n/a	<0.001	n/a	<0.005	<0.01	<0.001	<0.001	0.000797 (J)	0.000243 (J)	<0.001

Notes:

a. Laboratory reports for the data presented in the table were submitted to DEQ directly by the third-party laboratory (DINs 80713, 80715, 81437, 81438, 82358, 83368, 84431, and 85103; dated February 20, 2025, and August 14, 2025)
b. J-flagged data indicate a concentration detected below the laboratory RDL; the reported value is a laboratory estimate.

ATTACHMENT 3
DISTRIBUTIONAL PLOTS

Piper Diagram



LEACHATEBLDGA 2025-05-16

LEACHATEBLDGB 2025-05-16

LEACHATEBLDGC 2025-05-16

MW-14R* 2025-05-07

MW-17R* 2025-05-08

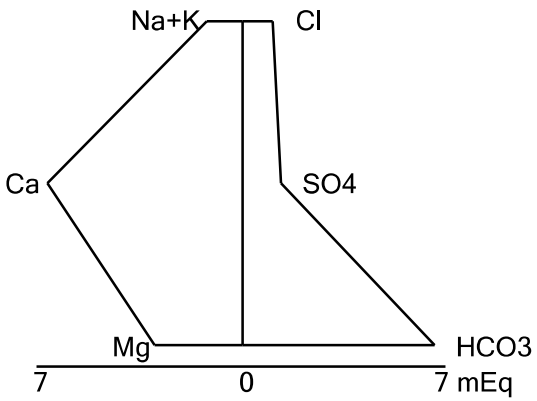
MW-20R 2025-05-08

MW-22* 2025-05-07

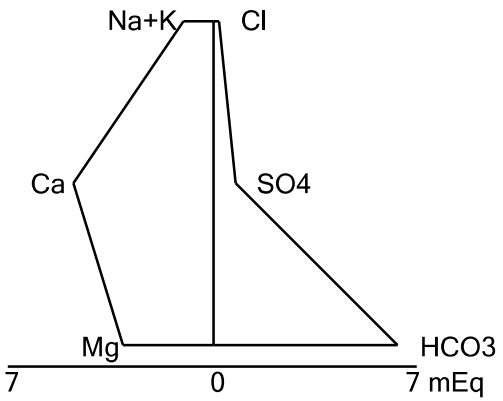
(*) indicates well is a background or hydraulically upgradient well.

Analysis Run 10/20/2025 1:56 PM

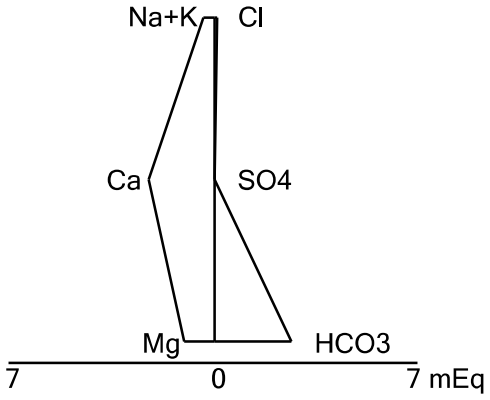
Legacy Landfill Client: CCSWDA Data: Craighead County LF - GWQ Parameters



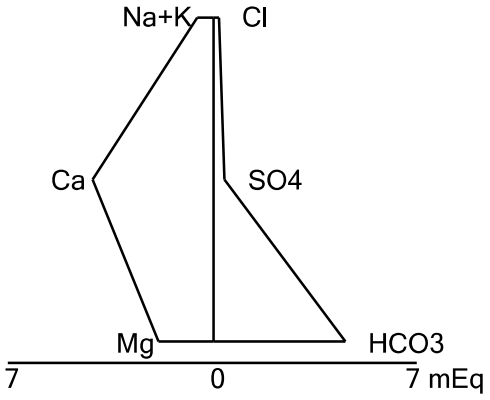
MW-14R* 2025-05-07



MW-17R* 2025-05-08



MW-22* 2025-05-07

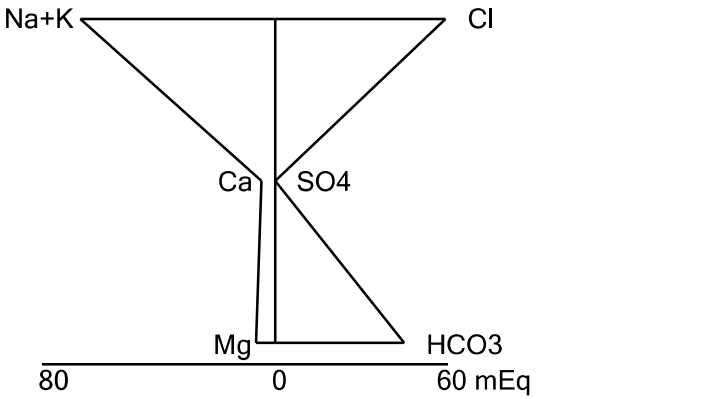


MW-20R 2025-05-08

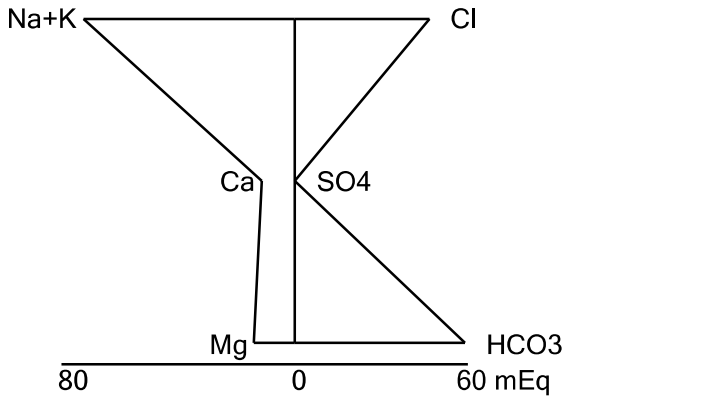
(*) indicates well is a background or hydraulically upgradient well.

Stiff Diagram Analysis Run 10/20/2025 2:01 PM

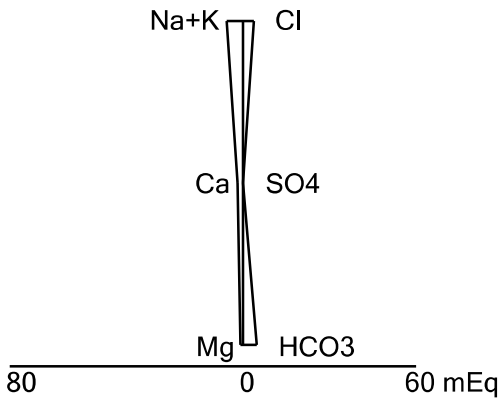
Legacy Landfill Client: CCSWDA Data: Craighead County LF - GWQ Parameters



LEACHATEBLDGA 2025-05-16



LEACHATEBLDGC 2025-05-16



LEACHATEBLDGB 2025-05-16

Stiff Diagram Analysis Run 10/20/2025 2:02 PM

Legacy Landfill Client: CCSWDA Data: Craighead County LF - GWQ Parameters