# Annual Groundwater Monitoring Report

Appalachian Power Company

John E. Amos Plant

Landfill CCR Unit

Winfield, West Virginia

**January 2026**

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**Appendix 1 –** Groundwater Data Tables and Figures

**Appendix 2** – Groundwater Statistical Analyses

**Appendix 3 –** Alternative Source Demonstrations

**Appendix 4** – Not applicable

**Appendix 5** – Not applicable


**Abbreviations:**
ASD – Alternate Source Demonstration
CCR – Coal Combustion Residual
GWPS – Groundwater Protection Standard
SSI – Statistically Significant Increase
SSL – Statistically Significant Level
AMLF – Amos Landfill

## I. Overview

This *Annual Groundwater Monitoring and Corrective Action Report* (Report) has been prepared to report the status of activities for the preceding year for an existing Landfill CCR unit at Appalachian Power Company's, a wholly-owned subsidiary of American Electric Power Company (AEP), John E. Amos Power Plant. The USEPA's CCR rules require that the Annual Groundwater Monitoring Report be posted to the operating record for the preceding year no later than January 31.

In general, the following activities were completed:

- The Amos Landfill (AMLF) CCR Unit began 2025 in detection monitoring and continued in detection monitoring throughout the year.
- Groundwater data underwent various validation tests, including tests for completeness, valid values, transcription errors, and consistent units.
- Groundwater data summary tables, groundwater velocity, and flow direction maps are included in **Appendix 1**.
- The Amos Landfill (AMLF) continued in detection monitoring throughout all of 2025.
- Statistical analysis for the May 2024 detection monitoring sampling event was completed in October 2024. The statistical report for the event resulted in confirmed statistically significant increases (SSIs) and an alternate source demonstration (ASD) was completed successfully in January 2025 for the following:
    - MW-1801: Chloride
    - MW-1802: Calcium and Sulfate
- A statistical analysis background update was completed in January 2025.
- Statistical analysis for the October 2024 detection monitoring sampling event was completed in January 2025. There were no SSIs.
- A detection monitoring event was conducted at the AMLF in May 2025 and a resampling was completed in July 2025. Statistical analysis for this event was completed in October 2025. The statistical analysis resulted in confirmed SSIs. An ASD is being pursued and is ongoing. The ASD will be completed in early 2026.
- A detection monitoring event was conducted at the AMLF in November 2025. Potential SSIs were identified so resampling for verification will be performed. Resampling, laboratory analysis, and statistical evaluation will be completed in early 2026.
- The statistical analysis reports are included in **Appendix 2.**
- Any ASD performed in 2025 is included in **Appendix 3**.

The major components of this annual report, to the extent applicable at this time, are presented in sections that follow:

- A map/aerial photograph showing the Amos Landfill CCR management unit, all groundwater monitoring wells, and monitoring well identification numbers.
- All of the monitoring data collected, including the rate and direction of groundwater flow, plus a summary showing the number of samples collected per monitoring well, the dates the samples were collected and whether the sample was collected as part of detection monitoring or assessment monitoring programs (**Appendix 1**).
- Statistical comparison of monitoring data to determine if there have been SSI(s) or SSL(s) (Attached as **Appendix 2**, where applicable);
- Discussion of the alternative source demonstrations (**Appendix 3**).
- A summary of any transition between monitoring programs or an alternate monitoring frequency, for example the date and circumstances for transitioning from detection monitoring to assessment monitoring, in addition to identifying the constituents detected at a statistically significant increase over background concentrations, if applicable (Appendix 4). This is not applicable to this report
- Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a statement as to why that happened (Appendix 5). This is not applicable to this report.
- Other information required to be included in the annual report such as assessment of corrective measures, if applicable.

In addition, this report summarizes key actions completed, and where applicable, describes any problems encountered and actions taken to resolve those problems. The report includes a projection of key activities for the upcoming year.

## II. Groundwater Monitoring Well Locations and Identification Numbers

**Figure 1** depicts the PE-certified groundwater monitoring network, the monitoring well locations, and their corresponding identification numbers. The groundwater monitoring well network was updated in 2020. MW-1801 and MW-1802 replaced MW-1 and MW-5.

The monitoring well distribution adequately covers downgradient and upgradient areas as detailed in the revised *Groundwater Monitoring Well Network Evaluation Report*, referenced above, that was placed on the American Electric Power CCR public internet site on June 5, 2020.The groundwater quality monitoring network includes the following:

- Five upgradient wells: MW-6, MW-7R, MW-8, MW-9, and MW-10; and
- Four downgradient wells: MW-1801, MW-1802, MW-2, and MW-4.


**Legend**

- Upgradient Sampling Location
- Downgradient Sampling Location
- FGD Landfill

**Notes**

- Monitoring well coordinates provided by AEP.

700 350 0 700 Feet

**Site Layout**
**FGD Landfill**

AEP Amos Generating Plant
Winfield, West Virginia

Geosyntec consultants

Columbus, Ohio | 2022/01/26

Figure **1**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Amos\AEP-Amos_Landfill_Site_Layout_v2.mxd. ASoltero. 1/26/2022. CHA8423/04/08.

## III. Monitoring Wells Installed or Decommissioned

No monitoring wells were installed or decommissioned in 2025. The network design, as summarized in the *Groundwater Monitoring Well Network Evaluation* (2020) and as posted at the CCR website for Amos Plant's John E. Amos Landfill, did not change. That network design report, viewable on the AEP CCR web site, discusses the facility location, the hydrogeological setting, the hydrostratigraphic units, the uppermost aquifer, downgradient monitoring well locations and the upgradient monitoring well locations.

## IV. Groundwater Quality Data and Static Water Elevation Data, With Flow Rate and Direction Calculations and Discussion

**Appendix 1** contains tables showing the groundwater quality data collected since initiating CCR background sampling through results received in 2025. Static water elevation data from each monitoring event in 2025 are also shown in **Appendix 1**, along with the groundwater velocity calculations, groundwater flow direction, and potentiometric maps developed after each sampling event.

## V. Groundwater Quality Data Statistical Analysis

Statistical analysis for the May 2024 detection monitoring sampling event was completed in October 2024. The statistical report for the event resulted in confirmed statistically significant increases (SSIs) and an alternate source demonstration (ASD) was completed successfully in January 2025 for the following:

- MW-1801: Chloride
- MW-1802: Calcium and Sulfate

A statistical analysis background update was completed in January 2025.

Statistical analysis for the October 2024 detection monitoring sampling event was completed in January 2025. There were no SSIs.

A detection monitoring event was conducted at the AMLF in May 2025 and a resampling event was completed in July 2025. Statistical analysis for this event was completed in October 2025. The statistical analysis resulted in confirmed SSIs. An ASD is being pursued and is ongoing. The ASD will be completed in early 2026.

A detection monitoring event was conducted at the AMLF in November 2025. Potential SSIs were identified so resampling for verification will be performed. Resampling, laboratory analysis, and statistical evaluation will be completed in early 2026.

All statistical analysis reports completed in 2025 are included in **Appendix 2** and any ASD completed in 2025 are included in **Appendix 3**.

## VI. Alternative Source Demonstrations

Statistical analysis for the May 2024 detection monitoring sampling event was completed in October 2024. The statistical report for the event resulted in confirmed statistically significant increases (SSIs) and an alternate source demonstration (ASD) was completed successfully in January 2025 for the following:

- MW-1801: Chloride
- MW-1802: Calcium and Sulfate

A detection monitoring event was conducted at the AMLF in May 2025 and a resampling event was completed in July 2025. Statistical analysis for this event was completed in October 2025. The statistical analysis resulted in confirmed SSIs. An ASD is being pursued and is ongoing. The ASD will be completed in early 2026.

Any ASD completed in 2025 is included in appendix 3.

## VII. Discussion About Transition Between Monitoring Requirements or Alternate Monitoring Frequency

As of this annual report date there has been no transition between detection monitoring and assessment monitoring. Detection monitoring will continue in 2026 pending the results of the aforementioned ongoing ASD report for first 2025 semiannual event and statistical analysis regarding the October 2025 groundwater sampling event. If the first semiannual ASD is successful, the AMLF will remain in detection monitoring. If the ASD is not successful, the AMLF will proceed with assessment monitoring as required by 40 CFR 257.95.

If the statistical analysis of the October 2025 event results in any SSIs, an ASD will be investigated. If the ASD is successful, the AMLF will remain in detection monitoring. If the ASD is not successful, the AMLF will proceed with assessment monitoring as required by 40 CFR 257.95.

Regarding defining an alternate monitoring frequency, the groundwater velocity and monitoring well production are high enough at this facility that no modification to the semiannual assessment monitoring frequency is needed.

## VIII. Other Information Required

As required by the CCR detection monitoring rules in 40 CFR 257.94, sampling all CCR wells for the Appendix III parameters was completed in 2025. All required information has been included in this annual groundwater monitoring report.

## IX. Description of Any Problems Encountered in 2025 and Actions Taken

No significant problems were encountered. The low flow sampling effort went smoothly and the schedule was met to support the 2025 annual groundwater report preparation covering the groundwater monitoring activities in 2025.

## X. A Projection of Key Activities for the Upcoming Year

Key activities for 2026 include:

- Complete the ASD for the first 2025 semiannual sampling event within 90 days from certifying the statistics. If the ASD is unsuccessful, the CCR unit will transition into assessment monitoring. If it is successful, the CCR unit will continue detection monitoring on a semi-annual basis.
- Complete statistical evaluation for the October 2025 detection monitoring event.
- Perform an ASD, if necessary, for the October 2025 detection monitoring event if any SSIs are confirmed. If the ASD is necessary and is unsuccessful, the CCR unit will transition into assessment monitoring. If it is successful or no SSIs are confirmed, the CCR unit will continue detection monitoring on a semi-annual basis.
- Respond to any new data received in light of what the CCR rule requires.
- Preparation of the 2026 annual groundwater report.

# APPENDIX 1

Figures and Tables showing the groundwater monitoring network, data collected, and the rate and direction of groundwater flow.

**Table 1. Groundwater Data Summary: MW-1**
**Amos - LF**
**Appendix III Constituents**



| Collection Date | Monitoring Program | Boron | Calcium | Chloride | Fluoride | pH | Sulfate | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|
| | | mg/L | mg/L | mg/L | mg/L | S.U. | mg/L | mg/L |
| 8/23/2016 | Background | 0.044 | 31.1 | 3.45 | 0.09 J1 | 6.2 | 30.6 | 182 |
| 10/18/2016 | Background | 0.060 | 29.0 | 3.31 | 0.09 | 6.5 | 30.8 | 232 |
| 11/09/2016 | Background | 0.076 | 29.9 | 3.42 | 0.10 | 6.5 | 31.3 | 194 |
| 12/13/2016 | Background | 0.065 | 29.3 | 3.08 | 0.07 J1 | 6.1 | 27.7 | 250 |
| 2/09/2017 | Background | 0.050 | 26.8 | 3.16 | 0.09 | 6.3 | 27.9 | 234 |
| 3/16/2017 | Background | 0.046 | 28.4 | 3.32 | 0.09 | 7.5 | 29.4 | 216 |
| 5/23/2017 | Background | 0.123 | 30.2 | 3.19 | 0.09 | 6.6 | 28.5 | 215 |
| 6/21/2017 | Background | 0.037 | 28.1 | 4.94 | 0.08 | 6.4 | 31.9 | 204 |
| 11/01/2017 | Detection | 0.047 | 28.7 | 3.08 | 0.10 | 6.4 | 30.2 | 224 |
| 5/02/2018 | Detection | 0.134 | 27.2 | 3.22 | 0.10 | 6.5 | 29.9 | 194 |
| 11/29/2018 | Detection | 0.143 | 26.4 | 3.07 | 0.11 | 6.7 | 27.8 | 191 |
| 12/18/2018 | Detection | 0.07 J1 | -- | -- | -- | 6.5 | -- | -- |
| 6/11/2019 | Detection | 0.04 J1 | 28.1 | 2.86 | 0.11 | 7.0 | 29.9 | 184 |
| 11/06/2019 | Detection | 0.04 J1 | 30.1 | 3.20 | 0.10 | 6.2 | 29.4 | 193 |

**Table 1. Groundwater Data Summary: MW-1**
**Amos - LF**
**Appendix IV Constituents**

| Collection Date | Monitoring Program | Antimony | Arsenic | Barium | Beryllium | Cadmium | Chromium | Cobalt | Combined Radium | Fluoride | Lead | Lithium | Mercury | Molybdenum | Selenium | Thallium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | pCi/L | mg/L | µg/L | mg/L | µg/L | µg/L | µg/L | µg/L |
| 8/23/2016 | Background | 0.04 J1 | 0.27 | 207 | 0.024 | 0.02 J1 | 0.3 | 0.097 | 0.0848 | 0.09 J1 | 0.186 | 0.017 | < 0.002 U1 | 0.04 J1 | 0.9 | 0.01 J1 |
| 10/18/2016 | Background | 0.04 J1 | 0.62 | 206 | 0.050 | 0.03 | 0.627 | 0.306 | 1.24 | 0.09 | 0.567 | 0.017 | 0.002 J1 | 0.08 J1 | 1.4 | 0.05 J1 |
| 11/09/2016 | Background | 0.04 J1 | 0.44 | 210 | 0.036 | 0.03 | 0.564 | 0.200 | 1.001 | 0.10 | 0.450 | 0.020 | < 0.002 U1 | 0.14 | 1.3 | 0.088 |
| 12/13/2016 | Background | 0.05 J1 | 1.09 | 232 | 0.100 | 0.01 J1 | 2.16 | 0.613 | 0.6701 | 0.07 J1 | 1.45 | 0.027 | < 0.002 U1 | 0.11 | 1.7 | 0.02 J1 |
| 2/09/2017 | Background | 0.03 J1 | 0.37 | 184 | 0.026 | 0.02 J1 | 0.401 | 0.174 | 0.836 | 0.09 | 0.340 | 0.015 | < 0.002 U1 | 0.21 | 1.6 | 0.02 J1 |
| 3/16/2017 | Background | 0.06 | 0.67 | 200 | 0.057 | 0.06 | 0.993 | 0.393 | 0.73 | 0.09 | 1.03 | 0.012 | 0.003 J1 | 0.10 | 1.1 | 0.02 J1 |
| 5/23/2017 | Background | 0.08 | 0.40 | 211 | 0.032 | 0.05 | 0.555 | 0.292 | 3.243 | 0.09 | 0.697 | 0.026 | < 0.002 U1 | 0.11 | 1.1 | 0.01 J1 |
| 6/21/2017 | Background | 0.07 | 0.43 | 200 | 0.031 | 0.06 | 0.547 | 0.289 | 1.379 | 0.08 | 0.753 | 0.013 | < 0.002 U1 | 0.10 | 1.2 | 0.02 J1 |

**Table 1. Groundwater Data Summary: MW-2**
**Amos - LF**
**Appendix III Constituents**

| Collection Date | Monitoring Program | Boron | Calcium | Chloride | Fluoride | pH | Sulfate | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|
| | | mg/L | mg/L | mg/L | mg/L | S.U. | mg/L | mg/L |
| 8/23/2016 | Background | 0.201 | 1.99 | 4.00 | 1.34 | 8.7 | 12.0 | 362 |
| 10/17/2016 | Background | 0.198 | 1.53 | 4.21 | 1.26 | 9.1 | 11.8 | 354 |
| 11/08/2016 | Background | 0.216 | 1.46 | 4.13 | 1.30 | 8.2 | 11.3 | 378 |
| 12/13/2016 | Background | 0.217 | 1.65 | 2.99 | 1.19 | 8.5 | 7.6 | 350 |
| 2/08/2017 | Background | 0.190 | 1.56 | 2.66 | 1.33 | 8.7 | 7.4 | 374 |
| 3/14/2017 | Background | 0.184 | 1.81 | 3.91 | 1.20 | 8.4 | 7.7 | 354 |
| 5/23/2017 | Background | 0.187 | 1.42 | 4.23 | 1.17 | 8.7 | 8.1 | 354 |
| 6/21/2017 | Background | 0.189 | 1.56 | 3.47 | 1.19 | 8.5 | 7.4 | 356 |
| 11/01/2017 | Detection | 0.202 | 1.88 | 2.34 | 1.46 | 8.8 | 8.6 | 394 |
| 1/08/2018 | Detection | 0.251 | -- | -- | 1.07 | 8.4 | -- | 353 |
| 5/01/2018 | Detection | 0.241 | 3.50 | 3.90 | 1.45 | 8.5 | 9.4 | 344 |
| 6/19/2018 | Detection | 0.338 | 1.79 | -- | 1.28 | 8.5 | -- | -- |
| 9/24/2018 | Detection | 0.215 | -- | -- | -- | -- | -- | -- |
| 11/28/2018 | Detection | 0.235 | 1.84 | 5.09 | 1.15 | 8.5 | 8.5 | 355 |
| 12/17/2018 | Detection | -- | -- | -- | -- | 8.6 | -- | -- |
| 1/24/2019 | Detection | 0.218 | -- | -- | -- | -- | -- | -- |
| 6/11/2019 | Detection | 0.215 | 1.80 | 3.26 | 1.63 | 8.7 | 9.4 | 379 |
| 7/22/2019 | Detection | -- | -- | -- | 1.41 | 8.7 | -- | -- |
| 11/06/2019 | Detection | 0.203 | 1.73 | 3.44 | 1.66 | 8.6 | 9.5 | 379 |
| 2/11/2020 | Detection | -- | -- | -- | 1.37 | 8.5 | -- | -- |
| 5/05/2020 | Detection | 0.174 | 2.76 | 5.08 | 1.37 | 8.6 | 7.8 | 368 |
| 7/07/2020 | Detection | -- | 2.74 | -- | -- | 8.5 | -- | -- |
| 11/03/2020 | Detection | 0.179 | 1.69 | 4.31 | 1.45 | 8.8 | 9.0 | 378 |
| 5/04/2021 | Detection | 0.220 | 2.04 | 3.60 | 1.62 | 8.7 | 8.2 | 386 |
| 7/21/2021 | Detection | -- | -- | -- | 1.41 | 8.4 | -- | -- |
| 11/02/2021 | Detection | 0.221 | 1.80 | 2.85 | 1.70 | 8.6 | 6.97 | 380 |
| 3/01/2022 | Detection | -- | -- | -- | 0.09 | 6.3 | -- | -- |
| 5/24/2022 | Detection | 0.227 | 1.82 | 3.39 | 1.60 | 6.1 | 9.29 | 370 L1 |
| 7/27/2022 | Detection | -- | -- | -- | -- | 8.7 | -- | -- |
| 11/01/2022 | Detection | 0.215 | 1.89 M1 | 2.93 | 1.63 | 8.8 | 8.31 | 380 |
| 5/26/2023 | Detection | 0.187 | 1.52 | 3.55 | 1.68 | 8.7 | 9.5 | 380 |
| 10/17/2023 | Detection | 0.217 | 2.20 | 3.39 | 1.51 | 8.5 | 8.7 | 360 |
| 5/09/2024 | Detection | 0.185 | 1.66 | 4.25 | 1.39 | 8.6 | 8.1 | 370 |
| 10/17/2024 | Detection | 0.226 | 2.04 | 3.76 | 1.49 | 8.4 | 7.3 | 380 |
| 5/14/2025 | Detection | 0.234 | 1.98 | 2.47 | 1.89 | 8.8 | 10.5 | 390 |
| 7/18/2025 | Detection | -- | -- | -- | 1.62 | 8.7 | -- | -- |
| 10/29/2025 | Detection | 0.202 | 1.83 | 4.98 | 1.39 | 8.5 | 8.71 | 380 |

**Table 1. Groundwater Data Summary: MW-2**
**Amos - LF**
**Appendix IV Constituents**

| Collection Date | Monitoring Program | Antimony | Arsenic | Barium | Beryllium | Cadmium | Chromium | Cobalt | Combined Radium | Fluoride | Lead | Lithium | Mercury | Molybdenum | Selenium | Thallium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | pCi/L | mg/L | µg/L | mg/L | µg/L | µg/L | µg/L | µg/L |
| 8/23/2016 | Background | 0.03 J1 | 6.57 | 51.8 | 0.129 | 0.14 | 1.3 | 1.02 | 0.904 | 1.34 | 1.24 | 0.009 | < 0.002 U1 | 6.04 | 0.2 J1 | 0.03 J1 |
| 10/17/2016 | Background | 0.01 J1 | 3.94 | 25.7 | 0.040 | 0.005 J1 | 0.592 | 0.290 | 0.208 | 1.26 | 0.258 | 0.010 | < 0.002 U1 | 3.70 | 0.09 J1 | 0.067 |
| 11/08/2016 | Background | 0.01 J1 | 3.54 | 23.7 | 0.02 J1 | < 0.004 U1 | 0.295 | 0.107 | 0.8825 | 1.30 | 0.077 | 0.008 | < 0.002 U1 | 3.84 | 0.05 J1 | < 0.01 U1 |
| 12/13/2016 | Background | 0.01 J1 | 4.36 | 27.1 | 0.009 J1 | < 0.004 U1 | 0.952 | 0.075 | 0.288 | 1.19 | 0.068 | 0.011 | < 0.002 U1 | 6.11 | 0.05 J1 | < 0.01 U1 |
| 2/08/2017 | Background | < 0.01 U1 | 4.09 | 25.5 | 0.032 | 0.005 J1 | 0.571 | 0.287 | 1.109 | 1.33 | 0.279 | 0.009 | < 0.002 U1 | 5.55 | 0.1 | 0.02 J1 |
| 3/14/2017 | Background | 0.02 J1 | 3.72 | 31.9 | 0.071 | 0.02 | 1.01 | 0.573 | 2.863 | 1.20 | 0.651 | 0.010 | 0.002 J1 | 3.46 | 0.2 | 0.02 J1 |
| 5/23/2017 | Background | 0.03 J1 | 3.59 | 27.2 | 0.043 | 0.009 J1 | 0.605 | 0.341 | 0.796 | 1.17 | 0.333 | 0.010 | < 0.002 U1 | 3.70 | 0.1 | < 0.01 U1 |
| 6/21/2017 | Background | 0.03 J1 | 3.80 | 27.7 | 0.028 | 0.01 J1 | 0.490 | 0.234 | 1.1188 | 1.19 | 0.229 | 0.004 | 0.003 J1 | 4.57 | 0.08 J1 | 0.03 J1 |

**Table 1. Groundwater Data Summary: MW-4**
**Amos - LF**
**Appendix III Constituents**

| Collection Date | Monitoring Program | Boron | Calcium | Chloride | Fluoride | pH | Sulfate | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|
| | | mg/L | mg/L | mg/L | mg/L | S.U. | mg/L | mg/L |
| 8/23/2016 | Background | 0.173 | 0.914 | 14.1 | 1.49 | 9.9 | 10.7 | 368 |
| 10/18/2016 | Background | 0.165 | 0.807 | 13.9 | 1.33 | 9.8 | 11.7 | 386 |
| 11/07/2016 | Background | 0.203 | 0.842 | 14.6 | 1.44 | 9.5 | 11.1 | 376 |
| 12/13/2016 | Background | 0.180 | 0.836 | 15.7 | 1.34 | 9.0 | 8.0 | 372 |
| 2/08/2017 | Background | 0.170 | 0.807 | 14.9 | 1.40 | 9.3 | 8.0 | 412 |
| 3/14/2017 | Background | 0.173 | 0.855 | 14.5 | 1.46 | 8.8 | 7.4 | 381 |
| 5/23/2017 | Background | 0.190 | 0.750 | 15.3 | 1.38 | 9.2 | 7.9 | 390 |
| 6/20/2017 | Background | 0.161 | 0.814 | 15.1 | 1.36 | 9.1 | 7.6 | 392 |
| 11/01/2017 | Detection | 0.194 | 0.766 | 14.2 | 1.36 | 9.4 | 9.3 | 404 |
| 1/08/2018 | Detection | 0.145 | -- | -- | 1.37 | 3.3 | -- | -- |
| 5/01/2018 | Detection | 0.199 | 0.783 | 14.9 | 1.47 | 9.2 | 9.0 | 380 |
| 11/27/2018 | Detection | 0.188 | 0.807 | 14.1 | 1.42 | 8.8 | 8.8 | 383 |
| 6/12/2019 | Detection | 0.167 | 0.788 | 14.4 | 1.46 | 8.6 | 9.0 | 415 |
| 11/06/2019 | Detection | 0.173 | 0.761 | 14.9 | 1.49 | 9.2 | 9.4 | 382 |
| 5/05/2020 | Detection | 0.150 | 0.790 | 15.2 | 1.37 | 9.2 | 8.4 | 397 |
| 11/03/2020 | Detection | 0.157 | 0.783 | 17.1 | 1.53 | 9.4 | 9.7 | 397 |
| 1/05/2021 | Detection | -- | -- | 18.0 | 1.48 | 9.4 | -- | -- |
| 5/04/2021 | Detection | 0.168 | 0.695 | 19.7 | 1.50 | 9.2 | 8.8 | 410 |
| 7/21/2021 | Detection | -- | -- | 20.8 | -- | 9.0 | -- | -- |
| 11/04/2021 | Detection | 0.167 | 0.7 | 21.8 | 1.40 | 9.1 | 7.86 | 390 |
| 3/01/2022 | Detection | -- | -- | 25.1 | -- | 9.3 | -- | -- |
| 5/25/2022 | Detection | 0.171 | 0.95 | 24.2 | 1.34 | 8.3 | 9.79 | 400 L1 |
| 7/26/2022 | Detection | -- | 0.89 | -- | -- | 9.2 | -- | -- |
| 11/01/2022 | Detection | 0.170 | 0.87 | 26.1 | 1.28 | 9.3 | 9.39 | 400 |
| 2/08/2023 | Detection | -- | -- | 27.5 | -- | 9.2 | -- | -- |
| 5/26/2023 | Detection | 0.151 | 0.77 | 23.8 | 1.39 | 9.0 | 9.8 | 400 |
| 10/17/2023 | Detection | 0.165 | 0.90 M1 | 23.3 | 1.35 | 9.4 | 9.5 | 370 |
| 5/09/2024 | Detection | 0.151 | 0.85 | 23.7 | 1.34 | 9.1 | 9.3 | 390 |
| 10/17/2024 | Detection | 0.153 | 0.77 | 22.7 | 1.36 | 9.2 | 8.6 | 410 |
| 5/13/2025 | Detection | 0.159 | 0.86 | 25.7 | 1.47 | 9.3 | 11.0 | 400 |
| 10/28/2025 | Detection | 0.167 | 0.92 | 23.2 | 1.46 | 9.3 | 10.4 | 430 |

**Table 1. Groundwater Data Summary: MW-4**
**Amos - LF**
**Appendix IV Constituents**

| Collection Date | Monitoring Program | Antimony | Arsenic | Barium | Beryllium | Cadmium | Chromium | Cobalt | Combined Radium | Fluoride | Lead | Lithium | Mercury | Molybdenum | Selenium | Thallium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | pCi/L | mg/L | µg/L | mg/L | µg/L | µg/L | µg/L | µg/L |
| 8/23/2016 | Background | 0.01 J1 | 9.61 | 24.1 | 0.020 | 0.11 | 0.9 | 0.158 | 0.444 | 1.49 | 0.371 | 0.008 | < 0.002 U1 | 8.82 | 0.09 J1 | < 0.01 U1 |
| 10/18/2016 | Background | < 0.01 U1 | 8.81 | 20.2 | < 0.005 U1 | 0.006 J1 | 0.064 | 0.014 | 0.152 | 1.33 | 0.021 | 0.002 | < 0.002 U1 | 8.01 | < 0.03 U1 | 0.03 J1 |
| 11/07/2016 | Background | < 0.01 U1 | 9.07 | 21.5 | < 0.005 U1 | < 0.004 U1 | 1.68 | 0.029 | 1.56 | 1.44 | 0.007 J1 | 0.003 | < 0.002 U1 | 8.14 | < 0.03 U1 | < 0.01 U1 |
| 12/13/2016 | Background | < 0.01 U1 | 9.44 | 22.4 | < 0.005 U1 | < 0.004 U1 | 0.169 | 0.011 | 0.16 | 1.34 | 0.009 J1 | 0.007 | < 0.002 U1 | 8.94 | < 0.03 U1 | 0.02 J1 |
| 2/08/2017 | Background | < 0.01 U1 | 8.78 | 19.2 | 0.006 J1 | < 0.004 U1 | 0.122 | 0.043 | 0.567 | 1.40 | 0.064 | 0.006 | < 0.002 U1 | 8.15 | < 0.03 U1 | 0.03 J1 |
| 3/14/2017 | Background | < 0.01 U1 | 10.1 | 20.4 | 0.005 J1 | 0.005 J1 | 0.523 | 0.041 | 1.456 | 1.46 | 0.114 | 0.006 | < 0.002 U1 | 9.70 | < 0.03 U1 | < 0.01 U1 |
| 5/23/2017 | Background | 0.02 J1 | 8.96 | 21.1 | < 0.004 U1 | < 0.005 U1 | 0.104 | 0.008 J1 | 0.872 | 1.38 | 0.01 J1 | 0.012 | < 0.002 U1 | 8.21 | < 0.03 U1 | < 0.01 U1 |
| 6/20/2017 | Background | 0.02 J1 | 9.15 | 21.8 | 0.004 J1 | 0.005 J1 | 0.157 | 0.037 | 0.905 | 1.36 | 0.039 | 0.005 | < 0.002 U1 | 7.86 | 0.05 J1 | < 0.01 U1 |

**Table 1. Groundwater Data Summary: MW-5**
**Amos - LF**
**Appendix III Constituents**

| Collection Date | Monitoring Program | Boron | Calcium | Chloride | Fluoride | pH | Sulfate | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|
| | | mg/L | mg/L | mg/L | mg/L | S.U. | mg/L | mg/L |
| 8/23/2016 | Background | 0.032 | 18.4 | 3.59 | 0.14 | 9.9 | 29.3 | 124 |
| 10/18/2016 | Background | 0.034 | 15.6 | 3.61 | 0.12 | 6.4 | 29.3 | 148 |
| 11/08/2016 | Background | 0.034 | 14.3 | 3.52 | 0.11 | 6.3 | 25.5 | 92 |
| 12/13/2016 | Background | 0.015 | 14.6 | 3.61 | 0.07 | 8.2 | 24.3 | 100 |
| 2/08/2017 | Background | 0.030 | 14.1 | 3.54 | 0.09 | 6.4 | 24.0 | 126 |
| 3/16/2017 | Background | 0.026 | 15.9 | 3.72 | 0.09 | 7.0 | 24.9 | 158 |
| 5/23/2017 | Background | 0.032 | 13.7 | 3.70 | 0.09 | 6.3 | 24.2 | 108 |
| 6/20/2017 | Background | 0.017 | 14.5 | 3.66 | 0.08 | 6.0 | 27.8 | 102 |
| 11/01/2017 | Detection | 0.046 | 15.6 | 4.09 | 0.09 | 6.1 | 28.4 | 136 |
| 1/08/2018 | Detection | -- | -- | 4.22 | -- | 6.7 | -- | -- |
| 5/02/2018 | Detection | 0.123 | 14.3 | 4.39 | 0.09 | 6.2 | 26.3 | 122 |
| 6/20/2018 | Detection | 0.126 | -- | 4.61 | -- | 6.1 | -- | -- |
| 11/29/2018 | Detection | 0.122 | 14.1 | 4.86 | 0.13 | 7.4 | 24.5 | 113 |
| 12/17/2018 | Detection | -- | -- | 4.77 | -- | 6.2 | -- | -- |
| 6/12/2019 | Detection | 0.02 J1 | 16.2 | 4.60 | 0.11 | 6.1 | 26.4 | 132 |
| 7/22/2019 | Detection | -- | -- | 4.61 | -- | 6.0 | -- | -- |
| 11/05/2019 | Detection | 0.03 J1 | 18.3 | 5.21 | 0.10 | -- | 28.3 | 131 |
| 11/06/2019 | Detection | -- | -- | -- | -- | 6.0 | -- | -- |
| 2/11/2020 | Detection | -- | 18.5 | -- | -- | 5.8 | -- | -- |

**Table 1. Groundwater Data Summary: MW-5**
**Amos - LF**
**Appendix IV Constituents**



| Collection Date | Monitoring Program | Antimony | Arsenic | Barium | Beryllium | Cadmium | Chromium | Cobalt | Combined Radium | Fluoride | Lead | Lithium | Mercury | Molybdenum | Selenium | Thallium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | pCi/L | mg/L | µg/L | mg/L | µg/L | µg/L | µg/L | µg/L |
| 8/23/2016 | Background | 0.04 J1 | 0.47 | 93.3 | 0.02 J1 | 0.07 | 0.3 | 0.188 | 1.025 | 0.14 | 0.263 | 0.006 | < 0.002 U1 | 0.17 | 0.1 | 0.01 J1 |
| 10/18/2016 | Background | 0.04 J1 | 0.34 | 82.5 | 0.02 J1 | 0.02 | 0.546 | 0.198 | 0.353 | 0.12 | 0.250 | 0.005 | < 0.002 U1 | 0.16 | 0.2 | 0.03 J1 |
| 11/08/2016 | Background | 0.04 J1 | 0.49 | 80.1 | 0.050 | 0.05 | 0.945 | 0.446 | 1.847 | 0.11 | 0.698 | < 0.0002 U1 | < 0.002 U1 | 0.14 | 0.1 | 0.01 J1 |
| 12/13/2016 | Background | 0.04 J1 | 0.51 | 80.9 | 0.033 | 0.03 | 0.622 | 0.339 | 1.18 | 0.07 | 0.442 | 0.010 | < 0.002 U1 | 0.18 | 0.2 | 0.070 |
| 2/08/2017 | Background | 0.02 J1 | 0.30 | 70.2 | 0.022 | 0.02 J1 | 0.465 | 0.217 | 0.5868 | 0.09 | 0.257 | 0.005 | < 0.002 U1 | 0.14 | 0.1 | 0.02 J1 |
| 3/16/2017 | Background | 0.09 | 2.32 | 121 | 0.183 | 0.21 | 4.43 | 2.92 | 1.096 | 0.09 | 3.77 | 0.002 | 0.008 | 0.40 | 0.9 | 0.04 J1 |
| 5/23/2017 | Background | 0.06 | 0.21 | 77.7 | 0.01 J1 | 0.02 | 0.248 | 0.072 | 1.312 | 0.09 | 0.093 | 0.011 | < 0.002 U1 | 0.14 | 0.09 J1 | < 0.01 U1 |
| 6/20/2017 | Background | 0.02 J1 | 0.25 | 80.6 | 0.01 J1 | 0.03 | 0.291 | 0.092 | 1.141 | 0.08 | 0.097 | < 0.0002 U1 | < 0.002 U1 | 0.09 J1 | 0.09 J1 | < 0.01 U1 |

**Table 1. Groundwater Data Summary: MW-6**
**Amos - LF**
**Appendix III Constituents**

| Collection Date | Monitoring Program | Boron | Calcium | Chloride | Fluoride | pH | Sulfate | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|
| | | mg/L | mg/L | mg/L | mg/L | S.U. | mg/L | mg/L |
| 8/24/2016 | Background | 0.095 | 40.7 | 7.78 | 0.26 | 7.6 | 41.3 | 408 |
| 10/19/2016 | Background | 0.093 | 39.8 | 7.67 | 0.23 | 7.9 | 51.1 | 438 |
| 11/07/2016 | Background | 0.147 | 42.7 | 7.76 | 0.25 | 7.7 | 51.6 | 426 |
| 12/12/2016 | Background | 0.109 | 44.4 | 8.17 | 0.20 | 7.5 | 54.0 | 414 |
| 2/07/2017 | Background | 0.122 | 36.7 | 7.20 | 0.23 | 7.5 | 31.1 | 380 |
| 3/16/2017 | Background | 0.098 | 37.1 | 7.09 | 0.24 | 7.9 | 29.1 | 388 |
| 5/22/2017 | Background | 0.171 | 33.7 | 6.89 | 0.23 | 7.7 | 24.7 | 359 |
| 6/19/2017 | Background | 0.154 | 37.2 | 7.01 | 0.21 | 7.4 | 33.1 | 386 |
| 11/02/2017 | Detection | 0.159 | 41.3 | 7.77 | 0.22 | 7.5 | 51.8 | 440 |
| 5/01/2018 | Detection | 0.163 | 33.4 | 6.94 | 0.26 | 7.4 | 24.7 | 358 |
| 11/28/2018 | Detection | 0.156 | 35.8 | 6.85 | 0.24 | 7.6 | 22.9 | 333 |
| 6/12/2019 | Detection | 0.08 J1 | 32.8 | 6.85 | 0.28 | 7.7 | 21.9 | 363 |
| 11/06/2019 | Detection | 0.100 | 39.8 | 8.00 | 0.24 | 7.4 | 33.2 | 390 |
| 5/07/2020 | Detection | 0.092 | 37.0 | 6.61 | 0.21 | 7.6 | 14.9 | 349 |
| 11/04/2020 | Detection | 0.088 | 38.4 | 7.63 | 0.28 | 7.7 | 32.5 | 375 |
| 5/04/2021 | Detection | 0.101 | 34.7 | 7.33 | 0.27 | 7.5 | 19.0 | 354 |
| 11/04/2021 | Detection | 0.093 | 35.1 | 7.51 | 0.25 | 7.4 | 22.1 | 360 |
| 5/26/2022 | Detection | 0.092 | 45.5 | 8.63 | 0.24 | 7.5 | 19.2 | 350 L1 |
| 11/02/2022 | Detection | 0.099 | 42.3 | 8.56 | 0.23 | 7.6 | 23.8 | 360 |
| 5/31/2023 | Detection | 0.091 | 39.1 | 8.84 | 0.23 | 7.3 | 19.9 | 350 |
| 10/18/2023 | Detection | 0.096 | 43.4 | 8.44 | 0.23 | 7.4 | 30.7 | 360 |
| 5/08/2024 | Detection | 0.094 | 39.5 | 9.30 | 0.23 | 7.3 | 23.9 | 350 |
| 10/17/2024 | Detection | 0.091 | 43.1 | 8.96 | 0.24 | 7.4 | 33.6 | 430 |
| 5/14/2025 | Detection | 0.092 | 38.7 | 13.3 | 0.27 | 8.8 | 21.1 | 340 |
| 10/29/2025 | Detection | 0.111 | 41.8 | 12.1 | 0.28 | 7.4 | 20.2 | 370 |

**Table 1. Groundwater Data Summary: MW-6**
**Amos - LF**
**Appendix IV Constituents**

| Collection Date | Monitoring Program | Antimony | Arsenic | Barium | Beryllium | Cadmium | Chromium | Cobalt | Combined Radium | Fluoride | Lead | Lithium | Mercury | Molybdenum | Selenium | Thallium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | pCi/L | mg/L | µg/L | mg/L | µg/L | µg/L | µg/L | µg/L |
| 8/24/2016 | Background | 0.04 J1 | 6.03 | 245 | 0.036 | 0.03 | 0.5 | 0.183 | 2.318 | 0.26 | 0.461 | 0.015 | < 0.002 U1 | 0.77 | 0.09 J1 | 0.138 |
| 10/19/2016 | Background | 0.02 J1 | 6.42 | 235 | 0.033 | 0.005 J1 | 0.413 | 0.148 | 0.697 | 0.23 | 0.381 | 0.015 | < 0.002 U1 | 0.36 | 0.09 J1 | 0.02 J1 |
| 11/07/2016 | Background | 0.01 J1 | 6.64 | 250 | 0.009 J1 | < 0.004 U1 | 0.160 | 0.023 | 2.70 | 0.25 | 0.053 | 0.011 | < 0.002 U1 | 0.36 | < 0.03 U1 | < 0.01 U1 |
| 12/12/2016 | Background | 0.01 J1 | 7.36 | 246 | 0.006 J1 | 0.01 J1 | 0.104 | 0.020 | 1.878 | 0.20 | 0.039 | 0.023 | < 0.002 U1 | 0.39 | 0.04 J1 | 0.03 J1 |
| 2/07/2017 | Background | < 0.01 U1 | 5.47 | 199 | 0.02 J1 | < 0.004 U1 | 0.207 | 0.073 | 1.151 | 0.23 | 0.160 | 0.013 | < 0.002 U1 | 0.44 | 0.05 J1 | 0.01 J1 |
| 3/16/2017 | Background | 0.03 J1 | 4.44 | 224 | < 0.005 U1 | 0.005 J1 | 0.498 | 0.028 | 1.844 | 0.24 | 0.048 | 0.009 | 0.003 J1 | 0.53 | 0.03 J1 | < 0.01 U1 |
| 5/22/2017 | Background | 0.04 J1 | 4.58 | 218 | 0.02 J1 | 0.009 J1 | 0.175 | 0.063 | 2.4 | 0.23 | 0.117 | 0.019 | < 0.002 U1 | 0.50 | 0.04 J1 | 0.01 J1 |
| 6/19/2017 | Background | 0.03 J1 | 4.86 | 233 | 0.01 J1 | < 0.005 U1 | 0.274 | 0.051 | 1.617 | 0.21 | 0.136 | 0.011 | < 0.002 U1 | 0.44 | 0.04 J1 | < 0.01 U1 |

**Table 1. Groundwater Data Summary: MW-7R**
**Amos - LF**
**Appendix III Constituents**

| Collection Date | Monitoring Program | Boron | Calcium | Chloride | Fluoride | pH | Sulfate | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|
| | | mg/L | mg/L | mg/L | mg/L | S.U. | mg/L | mg/L |
| 8/24/2016 | Background | 0.106 | 31.0 | 4.13 | 0.36 | 7.7 | 228 | 678 |
| 10/18/2016 | Background | 0.083 | 30.9 | 3.86 | 0.32 | 8.0 | 229 | 706 |
| 11/08/2016 | Background | 0.102 | 33.5 | 3.78 | 0.31 | 7.0 | 209 | 618 |
| 12/14/2016 | Background | 0.084 | 32.2 | 3.94 | 0.26 | 7.6 | 217 | 606 |
| 2/09/2017 | Background | 0.071 | 37.7 | 3.45 | 0.22 | 7.6 | 186 | 542 |
| 3/14/2017 | Background | 0.078 | 33.6 | 3.79 | 0.30 | 7.7 | 215 | 640 |
| 5/24/2017 | Background | 0.072 | 30.4 | 3.80 | 0.29 | 7.6 | 226 | 663 |
| 6/21/2017 | Background | 0.092 | 32.5 | 3.60 | 0.26 | 7.6 | 246 | 680 |
| 11/02/2017 | Detection | 0.109 | 31.7 | 3.59 | 0.28 | 7.6 | 211 | 636 |
| 5/01/2018 | Detection | 0.145 | 30.3 | 4.09 | 0.36 | 7.7 | 239 | 688 |
| 11/28/2018 | Detection | 0.118 | 44.4 | 3.65 | 0.26 | 7.4 | 201 | 627 |
| 6/12/2019 | Detection | 0.1 J1 | 36.8 | 3.75 | 0.35 | 7.4 | 226 | 700 |
| 11/06/2019 | Detection | 0.099 | 26.6 | 4.15 | 0.34 | 7.5 | 217 | 655 |
| 5/06/2020 | Detection | 0.079 | 41.7 | 3.68 | 0.28 | 7.5 | 208 | 629 |
| 11/03/2020 | Detection | 0.077 | 37.9 | 3.93 | 0.35 | 7.6 | 247 | 731 |
| 5/04/2021 | Detection | 0.096 | 33.0 | 3.86 | 0.37 | 7.6 | 220 | 708 |
| 11/04/2021 | Detection | 0.090 | 29.0 | 3.76 | 0.33 | 7.5 | 210 | 730 |
| 5/26/2022 | Detection | 0.092 | 38.5 | 3.87 | 0.33 | 7.5 | 219 | 690 L1 |
| 11/02/2022 | Detection | 0.087 | 38.8 | 3.89 | 0.31 | 7.6 | 249 | 720 |
| 5/30/2023 | Detection | 0.071 | 46.8 | 3.55 | 0.26 | 7.3 | 198 | 650 |
| 10/17/2023 | Detection | 0.082 | 37.2 | 3.62 | 0.29 | 7.5 | 225 | 710 |
| 5/08/2024 | Detection | 0.095 | 30.4 | 3.62 | 0.33 | 7.4 | 197 | 670 |
| 10/17/2024 | Detection | 0.094 | 37.4 M1 | 3.70 | 0.30 | 7.4 | 224 | 720 |
| 5/14/2025 | Detection | 0.087 | 31.1 | 3.66 | 0.35 | 8.8 | 200 | 640 |
| 10/29/2025 | Detection | 0.092 | 44.5 | 3.61 | 0.33 | 7.4 | 197 | 660 S7 |

**Table 1. Groundwater Data Summary: MW-7R**
**Amos - LF**
**Appendix IV Constituents**

| Collection Date | Monitoring Program | Antimony | Arsenic | Barium | Beryllium | Cadmium | Chromium | Cobalt | Combined Radium | Fluoride | Lead | Lithium | Mercury | Molybdenum | Selenium | Thallium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | pCi/L | mg/L | µg/L | mg/L | µg/L | µg/L | µg/L | µg/L |
| 8/24/2016 | Background | 0.11 | 8.37 | 60.8 | 0.155 | 0.04 | 1.0 | 0.368 | 1.043 | 0.36 | 1.52 | 0.016 | 0.004 J1 | 25.7 | 0.4 | 0.061 |
| 10/18/2016 | Background | 0.07 | 7.13 | 51.4 | 0.111 | 0.01 J1 | 0.760 | 0.279 | 0.959 | 0.32 | 0.961 | 0.012 | 0.002 J1 | 23.2 | 0.3 | 0.03 J1 |
| 11/08/2016 | Background | 0.08 | 5.81 | 42.2 | 0.026 | 0.02 | 2.82 | 0.084 | 1.895 | 0.31 | 0.261 | 0.013 | < 0.002 U1 | 17.5 | 0.2 | 0.01 J1 |
| 12/14/2016 | Background | 0.09 | 7.33 | 44.3 | 0.028 | 0.01 J1 | 1.73 | 0.103 | 0.962 | 0.26 | 0.249 | 0.014 | < 0.002 U1 | 24.6 | 0.2 | 0.02 J1 |
| 2/09/2017 | Background | 0.05 | 4.21 | 41.7 | 0.01 J1 | 0.01 J1 | 0.217 | 0.065 | 0.0996 | 0.22 | 0.156 | 0.012 | < 0.002 U1 | 11.7 | 0.08 J1 | 0.02 J1 |
| 3/14/2017 | Background | 0.08 | 7.02 | 40.2 | 0.01 J1 | 0.01 J1 | 0.234 | 0.064 | 2.735 | 0.30 | 0.154 | 0.010 | < 0.002 U1 | 24.6 | 0.1 | 0.02 J1 |
| 5/24/2017 | Background | 0.10 | 7.48 | 42.0 | 0.01 J1 | 0.01 J1 | 0.242 | 0.080 | 0.3888 | 0.29 | 0.171 | 0.016 | < 0.002 U1 | 25.7 | 0.2 | 0.01 J1 |
| 6/21/2017 | Background | 0.08 | 6.69 | 39.1 | 0.006 J1 | 0.006 J1 | 0.154 | 0.043 | 1.497 | 0.26 | 0.064 | 0.010 | < 0.002 U1 | 22.9 | 0.1 | 0.01 J1 |

**Table 1. Groundwater Data Summary: MW-8**
**Amos - LF**
**Appendix III Constituents**

| Collection Date | Monitoring Program | Boron | Calcium | Chloride | Fluoride | pH | Sulfate | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|
| | | mg/L | mg/L | mg/L | mg/L | S.U. | mg/L | mg/L |
| 8/24/2016 | Background | 0.021 | 141 | 13.3 | 0.16 | 7.0 | 73.6 | 578 |
| 10/19/2016 | Background | 0.037 | 135 | 12.6 | 0.15 | 7.2 | 66.5 | 538 |
| 11/09/2016 | Background | 0.029 | 137 | 5.12 | 0.07 | 6.9 | 26.1 | 532 |
| 12/14/2016 | Background | 0.017 | 136 | 14.2 | 0.13 | 6.8 | 59.7 | 504 |
| 2/08/2017 | Background | 0.092 | 132 | 12.9 | 0.15 | 6.9 | 67.5 | 540 |
| 3/15/2017 | Background | 0.074 | 151 | 13.5 | 0.16 | 7.2 | 74.5 | 623 |
| 5/24/2017 | Background | 0.031 | 137 | 13.9 | 0.14 | 6.8 | 73.2 | 596 |
| 6/20/2017 | Background | 0.034 | 139 | 12.6 | 0.13 | 6.9 | 77.2 | 574 |
| 11/02/2017 | Detection | 0.031 | 125 | 12.1 | 0.15 | 6.8 | 63.1 | 526 |
| 5/01/2018 | Detection | 0.065 | 136 | 13.1 | 0.17 | 6.9 | 78.8 | 592 |
| 11/29/2018 | Detection | 0.05 J1 | 126 | 13.2 | 0.17 | 6.8 | 58.8 | 558 |
| 6/12/2019 | Detection | 0.03 J1 | 125 | 8.58 | 0.20 | 7.6 | 54.5 | 540 |
| 11/06/2019 | Detection | < 0.02 U1 | 134 | 21.2 | 0.16 | 6.8 | 78.6 | 613 |
| 5/07/2020 | Detection | < 0.02 U1 | 115 | 15.3 | 0.15 | 7.0 | 98.4 | 590 |
| 11/04/2020 | Detection | < 0.02 U1 | 112 | 9.87 | 0.20 | 6.8 | 87.3 | 549 |
| 5/04/2021 | Detection | 0.02 J1 | 94.1 | 6.32 | 0.20 | 7.1 | 73.8 | 472 |
| 11/03/2021 | Detection | < 0.09 U1 | 111 | 60.9 | 0.18 | 7.0 | 64.9 | 570 |
| 5/26/2022 | Detection | 0.020 J1 | 102 | 63.8 | 0.17 | 7.4 | 76.3 | 560 L1 |
| 11/02/2022 | Detection | 0.023 J1 | 107 | 76.8 | 0.16 | 7.0 | 79.9 | 580 |
| 5/30/2023 | Detection | 0.045 J1 | 125 | 87.4 | 0.15 | 7.0 | 97.7 | 630 |
| 10/17/2023 | Detection | 0.023 J1 | 112 | 73.5 | 0.15 | 7.0 | 98.3 | 590 |
| 5/09/2024 | Detection | 0.022 J1 | 97.7 | 67.2 | 0.17 | 7.3 | 125 | 640 |
| 10/18/2024 | Detection | 0.024 J1 | 119 | 128 | 0.15 | 6.8 | 127 | 700 |
| 5/14/2025 | Detection | 0.023 J1 | 109 | 84.3 | 0.20 | 7.2 | 137 | 650 |
| 10/29/2025 | Detection | 0.046 J1 | 125 | 131 | 0.19 | 6.7 | 113 | 700 |

**Table 1. Groundwater Data Summary: MW-8**
**Amos - LF**
**Appendix IV Constituents**

| Collection Date | Monitoring Program | Antimony | Arsenic | Barium | Beryllium | Cadmium | Chromium | Cobalt | Combined Radium | Fluoride | Lead | Lithium | Mercury | Molybdenum | Selenium | Thallium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | pCi/L | mg/L | µg/L | mg/L | µg/L | µg/L | µg/L | µg/L |
| 8/24/2016 | Background | 0.04 J1 | 0.41 | 221 | 0.021 | 0.04 | 0.4 | 0.270 | 0.776 | 0.16 | 0.393 | 0.013 | < 0.002 U1 | 0.40 | 0.2 | 0.03 J1 |
| 10/19/2016 | Background | 0.03 J1 | 0.35 | 195 | 0.01 J1 | 0.04 | 0.158 | 0.140 | 0.746 | 0.15 | 0.279 | 0.006 | < 0.002 U1 | 0.07 J1 | 0.2 | 0.02 J1 |
| 11/09/2016 | Background | 0.02 J1 | 0.25 | 209 | 0.008 J1 | < 0.004 U1 | 0.164 | 0.082 | 1.113 | 0.07 | 0.028 | 0.004 | < 0.002 U1 | 0.08 J1 | 0.2 | 0.02 J1 |
| 12/14/2016 | Background | 0.03 J1 | 0.32 | 212 | 0.008 J1 | 0.008 J1 | 0.097 | 0.083 | 1.582 | 0.13 | 0.062 | 0.013 | < 0.002 U1 | 0.10 | 0.2 | 0.02 J1 |
| 2/08/2017 | Background | 0.03 J1 | 0.37 | 192 | 0.01 J1 | 0.007 J1 | 0.131 | 0.059 | 1.223 | 0.15 | 0.109 | 0.007 | < 0.002 U1 | 0.47 | 0.1 | 0.136 |
| 3/15/2017 | Background | 0.05 J1 | 1.44 | 270 | 0.069 | 0.02 J1 | 2.39 | 1.02 | 3.405 | 0.16 | 1.43 | 0.011 | 0.003 J1 | 0.28 | 0.4 | 0.02 J1 |
| 5/24/2017 | Background | 0.07 | 0.47 | 201 | 0.02 J1 | 0.009 J1 | 0.354 | 0.201 | 1.257 | 0.14 | 0.260 | 0.016 | < 0.002 U1 | 0.11 | 0.2 | 0.01 J1 |
| 6/20/2017 | Background | 0.03 J1 | 0.35 | 182 | 0.02 J1 | 0.007 J1 | 0.192 | 0.077 | 1.065 | 0.13 | 0.142 | 0.005 | < 0.002 U1 | 0.07 J1 | 0.3 | 0.02 J1 |

**Table 1. Groundwater Data Summary: MW-9**
**Amos - LF**
**Appendix III Constituents**

| Collection Date | Monitoring Program | Boron | Calcium | Chloride | Fluoride | pH | Sulfate | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|
| | | mg/L | mg/L | mg/L | mg/L | S.U. | mg/L | mg/L |
| 8/24/2016 | Background | 0.064 | 80.1 | 6.30 | 0.24 | 7.3 | 37.3 | 414 |
| 10/19/2016 | Background | 0.042 | 103 | 6.09 | 0.18 | 7.5 | 36.4 | 444 |
| 11/09/2016 | Background | 0.076 | 90.6 | 6.11 | 0.22 | 7.2 | 34.5 | 420 |
| 12/13/2016 | Background | 0.057 | 94.4 | 6.59 | 0.18 | 7.1 | 35.1 | 390 |
| 2/08/2017 | Background | 0.052 | 99.0 | 6.22 | 0.16 | 7.1 | 34.9 | 382 |
| 3/15/2017 | Background | 0.093 | 99.1 | 6.26 | 0.22 | 7.4 | 35.8 | 402 |
| 5/23/2017 | Background | 0.084 | 86.4 | 6.21 | 0.18 | 7.1 | 34.8 | 438 |
| 6/20/2017 | Background | 0.079 | 93.8 | 6.17 | 0.15 | 7.0 | 38.4 | 424 |
| 11/02/2017 | Detection | 0.075 | 79.1 | 5.97 | 0.20 | 7.1 | 33.1 | 404 |
| 5/01/2018 | Detection | 0.200 | 73.1 | 6.14 | 0.26 | 7.2 | 30.9 | 402 |
| 11/29/2018 | Detection | 0.09 J1 | 78.8 | 6.08 | 0.21 | 7.1 | 31.6 | 412 |
| 6/11/2019 | Detection | 0.04 J1 | 97.6 | 6.03 | 0.20 | 7.3 | 37.9 | 436 |
| 11/07/2019 | Detection | 0.04 J1 | 85.8 | 6.11 | 0.19 | 7.3 | 38.2 | 442 |
| 5/06/2020 | Detection | 0.03 J1 | 80.3 | 2.53 | 0.22 | 7.2 | 22.4 | 333 |
| 11/04/2020 | Detection | 0.056 | 61.5 | 2.73 | 0.30 | 7.1 | 28.4 | 362 |
| 5/04/2021 | Detection | 0.064 | 57.0 | 3.96 | 0.28 | 7.2 | 29.8 | 396 |
| 11/03/2021 | Detection | 0.054 | 72.7 | 4.47 | 0.23 | 7.2 | 28.2 | 410 |
| 5/26/2022 | Detection | 0.052 | 99.4 | 4.78 | 0.21 | 7.7 | 33.9 | 410 L1 |
| 11/03/2022 | Detection | 0.064 | 84.7 M1 | 4.77 | 0.22 | 7.2 | 31.1 | 420 |
| 5/31/2023 | Detection | 0.041 J1 | 74.3 | 3.66 | 0.20 | 6.9 | 27.7 | 400 |
| 10/17/2023 | Detection | 0.052 | 60.6 | 3.67 | 0.22 | 7.1 | 28.1 | 380 |
| 5/08/2024 | Detection | 0.066 | 71.2 | 4.38 | 0.22 | 7.0 | 28.2 | 410 |
| 10/18/2024 | Detection | 0.054 | 59.3 | 2.61 | 0.25 | 7.0 | 20.3 | 350 |
| 5/13/2025 | Detection | 0.048 J1 | 56.3 | 2.14 | 0.29 | 8.8 | 26.0 | 340 S7 |
| 10/29/2025 | Detection | 0.055 | 61.2 | 3.06 | 0.29 | 7.3 | 27.1 | 390 |

**Table 1. Groundwater Data Summary: MW-9**
**Amos - LF**
**Appendix IV Constituents**

| Collection Date | Monitoring Program | Antimony | Arsenic | Barium | Beryllium | Cadmium | Chromium | Cobalt | Combined Radium | Fluoride | Lead | Lithium | Mercury | Molybdenum | Selenium | Thallium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | pCi/L | mg/L | µg/L | mg/L | µg/L | µg/L | µg/L | µg/L |
| 8/24/2016 | Background | 0.07 | 1.45 | 443 | 0.025 | 0.03 | 0.8 | 0.464 | 1.831 | 0.24 | 0.565 | 0.017 | < 0.002 U1 | 0.48 | 0.2 | 0.03 J1 |
| 10/19/2016 | Background | 0.04 J1 | 3.75 | 441 | 0.025 | 0.01 J1 | 0.625 | 0.372 | 3.035 | 0.18 | 0.478 | 0.010 | < 0.002 U1 | 0.27 | 0.1 | 0.03 J1 |
| 11/09/2016 | Background | 0.05 J1 | 1.12 | 491 | < 0.005 U1 | 0.02 J1 | 0.207 | 0.020 | 1.735 | 0.22 | 0.046 | 0.008 | < 0.002 U1 | 0.41 | 0.1 | 0.03 J1 |
| 12/13/2016 | Background | 0.04 J1 | 1.23 | 497 | < 0.005 U1 | 0.04 | 0.540 | 0.032 | 0.39 | 0.18 | 0.084 | 0.019 | < 0.002 U1 | 0.56 | 0.2 | < 0.01 U1 |
| 2/08/2017 | Background | 0.02 J1 | 1.78 | 388 | < 0.005 U1 | 0.03 | 0.078 | 0.033 | 1.448 | 0.16 | 0.058 | 0.012 | < 0.002 U1 | 0.27 | 0.1 | 0.02 J1 |
| 3/15/2017 | Background | 0.04 J1 | 4.40 | 603 | 0.074 | 0.04 | 1.43 | 1.51 | 2.365 | 0.22 | 1.81 | 0.009 | 0.002 J1 | 0.37 | 0.5 | 0.04 J1 |
| 5/23/2017 | Background | 0.07 | 0.96 | 425 | < 0.004 U1 | 0.02 J1 | 0.117 | 0.021 | 2.173 | 0.18 | 0.063 | 0.021 | < 0.002 U1 | 0.37 | 0.2 | 0.02 J1 |
| 6/20/2017 | Background | 0.05 J1 | 1.35 | 441 | < 0.004 U1 | 0.03 | 0.094 | 0.066 | 1.992 | 0.15 | 0.038 | 0.014 | < 0.002 U1 | 0.33 | 0.07 J1 | 0.02 J1 |

**Table 1. Groundwater Data Summary: MW-10**
**Amos - LF**
**Appendix III Constituents**

| Collection Date | Monitoring Program | Boron | Calcium | Chloride | Fluoride | pH | Sulfate | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|
| | | mg/L | mg/L | mg/L | mg/L | S.U. | mg/L | mg/L |
| 8/24/2016 | Background | 0.087 | 1.68 | 5.54 | 0.89 | 9.0 | 19.1 | 512 |
| 10/19/2016 | Background | 0.081 | 1.09 | 4.49 | 0.72 | 9.6 | 18.0 | 504 |
| 11/09/2016 | Background | 0.118 | 2.31 | 5.46 | 0.92 | 8.9 | 16.9 | 546 |
| 12/13/2016 | Background | 0.076 | 1.24 | 4.15 | 0.38 | 8.7 | 14.1 | 482 |
| 2/08/2017 | Background | 0.113 | 1.37 | 4.24 | 0.57 | 9.1 | 14.4 | 504 |
| 3/14/2017 | Background | 0.125 | 1.18 | 4.60 | 0.50 | 8.7 | 13.3 | 499 |
| 5/24/2017 | Background | 0.081 | 1.16 | 4.19 | 0.43 | 8.9 | 14.3 | 467 |
| 6/20/2017 | Background | 0.078 | 1.04 | 4.11 | 0.44 | 8.6 | 14.9 | 492 |
| 11/02/2017 | Detection | 0.095 | 1.12 | 5.08 | 0.55 | 9.2 | 17.0 | 508 |
| 5/02/2018 | Detection | 0.157 | 1.74 | 5.67 | 0.69 | 9.2 | 16.7 | 522 |
| 11/29/2018 | Detection | 0.174 | 1.03 | 5.27 | 0.59 | 8.7 | 15.3 | 506 |
| 6/11/2019 | Detection | 0.08 J1 | 1.03 | 5.12 | 0.72 | 9.0 | 16.0 | 524 |
| 11/06/2019 | Detection | 0.076 | 1.43 | 5.62 | 0.52 | 8.7 | 16.8 | 490 |
| 5/06/2020 | Detection | 0.074 | 1.25 | 4.90 | 0.60 | 8.6 | 13.0 | 526 |
| 11/04/2020 | Detection | 0.071 | 1.18 | 5.77 | 0.73 | 8.9 | 16.5 | 523 |
| 5/04/2021 | Detection | 0.081 | 0.916 | 5.48 | 0.73 | 9.0 | 14.7 | 519 |
| 11/05/2021 | Detection | 0.257 | 0.9 | 16.4 | 4.88 | 8.8 | 17.8 | 490 |
| 5/25/2022 | Detection | 0.083 | 1.44 | 4.10 | 0.51 | 6.0 | 14.1 | 510 L1 |
| 11/03/2022 | Detection | 0.088 | 1.68 | 5.60 | 0.65 | 7.5 | 14.4 | 520 |
| 5/30/2023 | Detection | 0.074 | 1.12 | 4.32 | 0.59 | 8.6 | 14.1 | 510 |
| 10/18/2023 | Detection | 0.068 | 1.96 | 5.22 | 0.57 | 8.4 | 15.2 | 450 |
| 5/14/2024 | Detection | 0.040 J1 | 0.74 | 5.07 | 0.38 | 8.4 | 13.8 | 470 |
| 10/17/2024 | Detection | -- | -- | -- | -- | 9.0 | -- | -- |
| 10/18/2024 | Detection | 0.065 | 1.25 | 4.28 | 0.37 | -- | 12.7 | 500 |
| 5/15/2025 | Detection | 0.075 | 1.13 | 4.84 | 0.59 | 9.0 | 15.8 | 510 |
| 10/30/2025 | Detection | 0.09 J1 | 1.54 | 5.50 | 0.67 | 9.0 | 16.1 | 500 |

**Table 1. Groundwater Data Summary: MW-10**
**Amos - LF**
**Appendix IV Constituents**

| Collection Date | Monitoring Program | Antimony | Arsenic | Barium | Beryllium | Cadmium | Chromium | Cobalt | Combined Radium | Fluoride | Lead | Lithium | Mercury | Molybdenum | Selenium | Thallium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | pCi/L | mg/L | µg/L | mg/L | µg/L | µg/L | µg/L | µg/L |
| 8/24/2016 | Background | 0.36 | 24.5 | 105 | 0.058 | 0.26 | 0.5 | 0.367 | 0.769 | 0.89 | 1.11 | 0.010 | 0.003 J1 | 3.08 | 0.5 | 0.01 J1 |
| 10/19/2016 | Background | 0.26 | 19.4 | 62.4 | 0.02 J1 | 0.01 J1 | 0.373 | 0.102 | 0.0283 | 0.72 | 0.357 | 0.008 | < 0.002 U1 | 2.58 | 0.4 | 0.082 |
| 11/09/2016 | Background | 0.38 | 21.5 | 144 | 0.264 | 0.05 | 3.96 | 1.66 | 0.168 | 0.92 | 3.41 | 0.007 | 0.004 J1 | 2.53 | 1.1 | 0.057 |
| 12/13/2016 | Background | 0.63 | 17.1 | 69.8 | 0.029 | 0.20 | 1.63 | 0.212 | 0.0992 | 0.38 | 0.895 | 0.019 | < 0.002 U1 | 2.79 | 0.7 | < 0.01 U1 |
| 2/08/2017 | Background | 0.38 | 22.8 | 92.9 | 0.124 | 0.04 | 2.28 | 0.850 | 0.14643 | 0.57 | 1.89 | 0.008 | 0.003 J1 | 2.76 | 1.9 | 0.071 |
| 3/14/2017 | Background | 0.32 | 21.2 | 69.0 | 0.039 | 0.01 J1 | 0.965 | 0.280 | 2.089 | 0.50 | 0.635 | 0.010 | 0.003 J1 | 3.38 | 2.3 | 0.02 J1 |
| 5/24/2017 | Background | 0.23 | 9.07 | 55.6 | 0.022 | 0.02 J1 | 0.500 | 0.151 | 1.06 | 0.43 | 0.469 | 0.011 | < 0.002 U1 | 3.52 | 0.5 | 0.01 J1 |
| 6/20/2017 | Background | 0.30 | 17.7 | 61.7 | 0.025 | 0.01 J1 | 0.577 | 0.170 | 0.1376 | 0.44 | 0.448 | 0.004 | < 0.002 U1 | 2.40 | 1.0 | 0.01 J1 |

**Table 1. Groundwater Data Summary: MW-1801**
**Amos - LF**
**Appendix III Constituents**

| Collection Date | Monitoring Program | Boron | Calcium | Chloride | Fluoride | pH | Sulfate | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|
| | | mg/L | mg/L | mg/L | mg/L | S.U. | mg/L | mg/L |
| 12/18/2018 | Background | 0.273 | 1.76 | 10.4 | 5.01 | 8.9 | 8.1 | 498 |
| 1/24/2019 | Background | 0.247 | 1.59 | 10.8 | 5.19 | 8.9 | 7.2 | 490 |
| 2/21/2019 | Background | 0.219 | 1.38 | 11.0 | 5.26 | 9.0 | 6.8 | 550 |
| 3/13/2019 | Background | 0.251 | 1.55 | 11.1 | 5.32 | 9.0 | 6.6 | 509 |
| 4/23/2019 | Background | 0.246 | 1.50 | 11.3 | 5.35 | 9.1 | 8.2 | 507 |
| 6/11/2019 | Background | 0.260 | 1.45 | 10.4 | 5.03 | 9.4 | 6.5 | 506 |
| 7/23/2019 | Background | 0.246 | 1.41 | 10.8 | 5.47 | 8.8 | 7.2 | 502 |
| 11/05/2019 | Background | 0.255 | 1.46 | 11.7 | 5.36 | 8.7 | 7.0 | 501 |
| 5/07/2020 | Detection | 0.252 | 1.65 | 11.6 | 4.98 | 8.9 | 6.8 | 541 |
| 11/04/2020 | Detection | 0.215 | 1.52 | 12.5 | 5.34 | 9.0 | 7.5 | 535 |
| 1/05/2021 | Detection | -- | -- | 11.7 | -- | 9.0 | -- | -- |
| 5/05/2021 | Detection | 0.250 | 1.65 | 13.1 | 5.24 | 8.8 | 9.1 | 542 |
| 7/21/2021 | Detection | -- | -- | 13.1 | -- | 8.6 | 7.63 | -- |
| 11/04/2021 | Detection | 0.245 | 1.5 | 13.5 | 5.13 | 8.7 | 6.31 | 530 |
| 2/28/2022 | Detection | -- | -- | 13.2 | -- | 8.8 | -- | -- |
| 5/25/2022 | Detection | 0.265 | 1.78 | 14.4 | 5.22 | 8.4 | 5.42 | 510 L1 |
| 7/27/2022 | Detection | -- | -- | 14.0 | -- | 8.8 | -- | -- |
| 11/01/2022 | Detection | 0.253 | 1.57 | 15.0 | 5.38 | 8.9 | 5.66 | 520 |
| 2/08/2023 | Detection | -- | -- | 14.2 | -- | 8.8 | -- | -- |
| 5/31/2023 | Detection | 0.220 | 1.47 | 14.9 | 5.32 | 8.6 | 4.6 | 510 |
| 7/19/2023 | Detection | -- | -- | 15.3 | -- | 8.8 | -- | -- |
| 10/17/2023 | Detection | 0.239 | 1.76 | 15.2 | 5.13 | 8.7 | 5.3 | 510 |
| 1/26/2024 | Detection | -- | -- | 14.2 | -- | 8.8 | -- | -- |
| 5/09/2024 | Detection | 0.225 | 1.68 | 16.2 | 5.28 | 8.7 | 4.6 | 510 |
| 7/16/2024 | Detection | -- | -- | 16.3 | -- | 8.9 | -- | -- |
| 10/17/2024 | Detection | 0.252 | 1.73 | 16.5 | 5.24 | 8.6 | 3.7 | 530 |
| 5/14/2025 | Detection | 0.243 | 1.57 | 17.3 | 5.39 | 8.8 | 4.9 | 540 |
| 7/18/2025 | Detection | -- | -- | 17.3 | -- | 8.8 | -- | -- |
| 10/29/2025 | Detection | 0.243 | 1.61 | 17.2 | 5.32 | 8.8 | 4.27 | 550 |

**Table 1. Groundwater Data Summary: MW-1801**
**Amos - LF**
**Appendix IV Constituents**

| Collection Date | Monitoring Program | Antimony | Arsenic | Barium | Beryllium | Cadmium | Chromium | Cobalt | Combined Radium | Fluoride | Lead | Lithium | Mercury | Molybdenum | Selenium | Thallium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | pCi/L | mg/L | µg/L | mg/L | µg/L | µg/L | µg/L | µg/L |
| 12/18/2018 | Background | 0.30 | 13.5 | 39.3 | 0.113 | 0.07 | 3.30 | 0.876 | 0.816 | 5.01 | 0.966 | < 0.009 U1 | < 0.002 U1 | 58.4 | 0.3 | < 0.1 U1 |
| 1/24/2019 | Background | 0.14 | 11.8 | 34.6 | 0.08 J1 | < 0.01 U1 | 2.56 | 0.436 | 0.983 | 5.19 | 0.544 | 0.032 | < 0.002 U1 | 64.5 | 0.2 J1 | < 0.1 U1 |
| 2/21/2019 | Background | 0.14 | 10.4 | 28.7 | 0.02 J1 | < 0.01 U1 | 0.585 | 0.162 | 0.175 | 5.26 | 0.272 | < 0.009 U1 | < 0.002 U1 | 66.3 | 0.1 J1 | < 0.1 U1 |
| 3/13/2019 | Background | 0.1 J1 | 9.02 | 26.6 | < 0.02 U1 | < 0.01 U1 | 0.463 | 0.143 | 0.58 | 5.32 | 0.116 | < 0.009 U1 | < 0.002 U1 | 60.8 | 0.05 J1 | < 0.1 U1 |
| 4/23/2019 | Background | 0.14 | 9.95 | 30.9 | 0.02 J1 | < 0.01 U1 | 0.722 | 0.180 | 0.751 | 5.35 | 0.240 | < 0.009 U1 | < 0.002 U1 | 69.4 | 0.06 J1 | < 0.1 U1 |
| 6/11/2019 | Background | 0.1 J1 | 7.80 | 25.4 | < 0.02 U1 | < 0.01 U1 | 0.336 | 0.120 | 0.208 | 5.03 | 0.09 J1 | < 0.009 U1 | < 0.002 U1 | 61.6 | 0.05 J1 | < 0.1 U1 |
| 7/23/2019 | Background | 0.06 J1 | 7.95 | 26.2 | < 0.02 U1 | < 0.01 U1 | 0.229 | 0.092 | 0.569 | 5.47 | 0.07 J1 | < 0.02 U1 | < 0.002 U1 | 62.7 | < 0.03 U1 | < 0.1 U1 |
| 11/05/2019 | Background | 0.04 J1 | 7.74 | 25.9 | < 0.02 U1 | < 0.01 U1 | 0.483 | 0.073 | 0.29 | 5.36 | 0.07 J1 | 0.00829 | < 0.002 U1 | 62.8 | < 0.03 U1 | < 0.1 U1 |

**Table 1. Groundwater Data Summary: MW-1802**
**Amos - LF**
**Appendix III Constituents**

| Collection Date | Monitoring Program | Boron | Calcium | Chloride | Fluoride | pH | Sulfate | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|
| | | mg/L | mg/L | mg/L | mg/L | S.U. | mg/L | mg/L |
| 12/17/2018 | Background | 0.267 | 0.821 | 8.33 | 4.79 | 9.1 | 20.6 | 482 |
| 1/25/2019 | Background | 0.249 | 0.924 | 8.87 | 4.82 | 9.1 | 20.3 | 451 |
| 2/21/2019 | Background | 0.233 | 0.840 | 8.94 | 4.87 | 9.3 | 20.1 | 532 |
| 3/13/2019 | Background | 0.234 | 0.860 | 9.21 | 4.75 | 9.3 | 18.8 | 477 |
| 4/24/2019 | Background | 0.242 | 0.910 | 9.13 | 5.04 | 9.2 | 21.2 | 478 |
| 6/12/2019 | Background | 0.253 | 0.876 | 9.01 | 4.54 | 9.0 | 19.1 | 476 |
| 7/23/2019 | Background | 0.236 | 0.865 | 8.80 | 5.16 | 9.0 | 20.7 | 476 |
| 11/05/2019 | Background | 0.254 | 0.892 | 9.90 | 4.84 | 8.9 | 19.7 | 460 |
| 5/07/2020 | Detection | 0.258 | 0.963 | 9.12 | 4.91 | 8.8 | 15.2 | 490 |
| 11/04/2020 | Detection | 0.223 | 0.974 | 10.7 | 4.89 | 9.2 | 19.0 | 494 |
| 1/05/2021 | Detection | -- | -- | 10.7 | -- | 9.3 | -- | -- |
| 5/05/2021 | Detection | 0.258 | 0.800 | 11.5 | 4.88 | 9.1 | 17.9 | 508 |
| 7/22/2021 | Detection | -- | -- | 13.5 | -- | 8.8 | -- | -- |
| 11/04/2021 | Detection | 0.082 | 1.0 | 5.47 | 0.73 | 9.0 | 13.2 | 510 |
| 3/01/2022 | Detection | -- | 1.0 | -- | -- | 9.1 | -- | -- |
| 5/25/2022 | Detection | 0.273 | 1.14 | 17.0 | 4.71 | 6.1 | 19.0 | 520 L1 |
| 7/27/2022 | Detection | -- | 1.16 | 14.9 | -- | 9.1 | -- | -- |
| 11/04/2022 | Detection | 0.261 | 1.13 | 17.0 | 4.86 | 9.2 | 18.2 | 510 |
| 2/08/2023 | Detection | -- | 0.99 | 16.8 | -- | 8.8 | -- | -- |
| 5/26/2023 | Detection | 0.221 | 0.82 | 17.2 | 4.99 | 8.9 | 19.3 | 510 |
| 7/19/2023 | Detection | -- | -- | 16.3 | -- | 9.1 | -- | -- |
| 10/17/2023 | Detection | 0.247 | 1.14 | 12.9 | 5.01 | 9.2 | 32.8 | 480 |
| 1/26/2024 | Detection | -- | 1.16 | -- | -- | 9.0 | 29.4 | -- |
| 5/09/2024 | Detection | 0.226 | 1.10 | 12.6 | 5.33 | 9.0 | 36.2 | 500 |
| 7/17/2024 | Detection | -- | 1.12 | -- | 5.13 | 9.0 | 24.9 | -- |
| 10/17/2024 | Detection | 0.247 | 0.97 | 13.3 | 5.25 | 8.9 | 34.2 | 520 |
| 5/13/2025 | Detection | 0.245 | 0.98 | 19.0 | 4.95 | 8.8 | 20.0 | 510 |
| 7/18/2025 | Detection | -- | -- | 20.1 | -- | 9.1 | -- | -- |
| 10/28/2025 | Detection | 0.26 | 1.12 | 19.5 | 5.05 | 9.0 | 21.2 | 530 |

**Table 1. Groundwater Data Summary: MW-1802**
**Amos - LF**
**Appendix IV Constituents**

| Collection Date | Monitoring Program | Antimony | Arsenic | Barium | Beryllium | Cadmium | Chromium | Cobalt | Combined Radium | Fluoride | Lead | Lithium | Mercury | Molybdenum | Selenium | Thallium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | pCi/L | mg/L | µg/L | mg/L | µg/L | µg/L | µg/L | µg/L |
| 12/17/2018 | Background | 0.03 J1 | 6.08 | 15.5 | < 0.02 U1 | < 0.01 U1 | 0.296 | 0.081 | 0.445 | 4.79 | 0.1 J1 | < 0.009 U1 | < 0.002 U1 | 22.7 | 0.04 J1 | < 0.1 U1 |
| 1/25/2019 | Background | 0.05 J1 | 6.00 | 17.1 | 0.03 J1 | < 0.01 U1 | 0.497 | 0.219 | 0.522 | 4.82 | 0.214 | 0.03 J1 | < 0.002 U1 | 23.1 | 0.05 J1 | < 0.1 U1 |
| 2/21/2019 | Background | 0.03 J1 | 6.42 | 16.1 | < 0.02 U1 | < 0.01 U1 | 0.232 | 0.083 | 0.1739 | 4.87 | 0.08 J1 | < 0.009 U1 | < 0.002 U1 | 24.9 | < 0.03 U1 | < 0.1 U1 |
| 3/13/2019 | Background | 0.04 J1 | 6.28 | 15.2 | < 0.02 U1 | < 0.01 U1 | 0.269 | 0.074 | 0.0735 | 4.75 | 0.1 J1 | < 0.009 U1 | < 0.002 U1 | 23.9 | < 0.03 U1 | < 0.1 U1 |
| 4/24/2019 | Background | 0.08 J1 | 6.24 | 17.0 | < 0.02 U1 | < 0.01 U1 | 0.300 | 0.099 | 0.281 | 5.04 | 0.142 | < 0.009 U1 | < 0.002 U1 | 28.0 | 0.06 J1 | < 0.1 U1 |
| 6/12/2019 | Background | 0.02 J1 | 5.66 | 13.6 | < 0.02 U1 | < 0.01 U1 | 0.08 J1 | 0.03 J1 | 0.418 | 4.54 | 0.04 J1 | < 0.009 U1 | < 0.002 U1 | 23.3 | < 0.03 U1 | < 0.1 U1 |
| 7/23/2019 | Background | 0.04 J1 | 6.43 | 15.5 | < 0.02 U1 | < 0.01 U1 | 0.281 | 0.071 | 0.0519 | 5.16 | 0.1 J1 | < 0.02 U1 | < 0.002 U1 | 26.9 | 0.05 J1 | < 0.1 U1 |
| 11/05/2019 | Background | 0.04 J1 | 6.37 | 14.6 | < 0.02 U1 | < 0.01 U1 | 0.273 | 0.04 J1 | 0.2057 | 4.84 | 0.06 J1 | 0.00714 | < 0.002 U1 | 26.8 | 0.05 J1 | < 0.1 U1 |

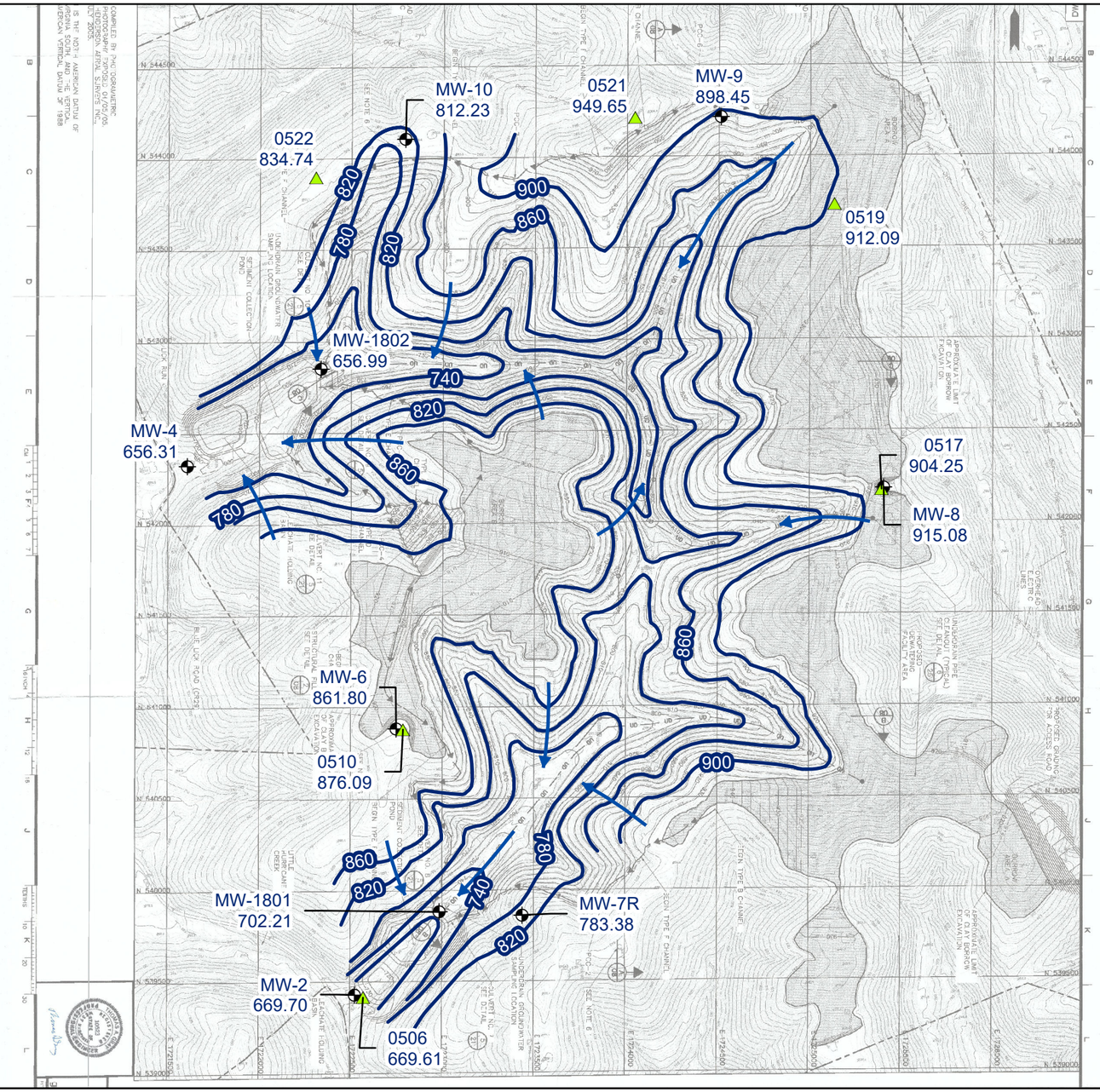
Notes:
Combined radium values were calculated from the sum of the reported radium-226 and radium-228 results.
Radium data quality flags were not included. Reported negative radium-226 or radium-228 results were replaced with zero.
--: Not analyzed
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
mg/L: milligrams per liter
pCi/L: picocuries per liter
S7: Sample did not achieve constant weight.
SU: standard unit
µg/L: micrograms per liter

**Table 1: Residence Time Calculation Summary**
**Amos Landfill**

*Geosyntec Consultants, Inc.*

| | | | 2025-05 | | 2025-07[3] | | 2025-10 | |
|---|---|---|---|---|---|---|---|---|
| CCR Management Unit | Monitoring Well | Well Diameter (inches) | Groundwater Velocity (ft/year) | Groundwater Residence Time (days) | Groundwater Velocity (ft/year) | Groundwater Residence Time (days) | Groundwater Velocity (ft/year) | Groundwater Residence Time (days) |
| Landfill | MW-2 [2] | 2.0 | 3.3 | 18 | 3.4 | 18 | 2.9 | 21 |
| | MW-4 [2] | 2.0 | 1.9 | 31 | 2.0 | 30 | 2.2 | 28 |
| | MW-6 [1] | 2.0 | 0.5 | 135 | 0.5 | 123 | 0.5 | 128 |
| | MW-7R [1] | 2.0 | 2.8 | 22 | 2.8 | 22 | 2.8 | 21 |
| | MW-8 [1] | 2.0 | 0.6 | 96 | 0.7 | 91 | 0.6 | 103 |
| | MW-9 [1] | 2.0 | 0.8 | 77 | 0.9 | 68 | 0.8 | 76 |
| | MW-10 [1] | 2.0 | 0.9 | 72 | 1.2 | 51 | 0.8 | 73 |
| | MW-1801 [2] | 2.0 | 2.4 | 26 | 2.4 | 25 | 2.3 | 27 |
| | MW-1802 [2] | 2.0 | 2.8 | 22 | 2.9 | 21 | 2.8 | 22 |

Notes:
[1] - Background Well
[2] - Downgradient Well
[3] - Verification sampling




**Legend**

- Groundwater Monitoring Well
- Piezometer
- Groundwater Elevation Contour
- Groundwater Flow Direction

**Notes**

1. Monitoring well coordinates and water level data (collected on May 12, 2025) provided by AEP.
2. As of 2023, a portion of the liner in Cell 4 was replaced with a riprap drainage blanket; re-lining construction is ongoing.
3. Topography and drainage system basemap from AEP Drawing No. 13-30500-05-A (topographic contour interval: 10 feet).
4. Groundwater elevation units are feet above mean sea level (ft amsl).

1,000 500 0 1,000 Feet

**Potentiometric Surface Map - Uppermost Aquifer**
**May 2025**

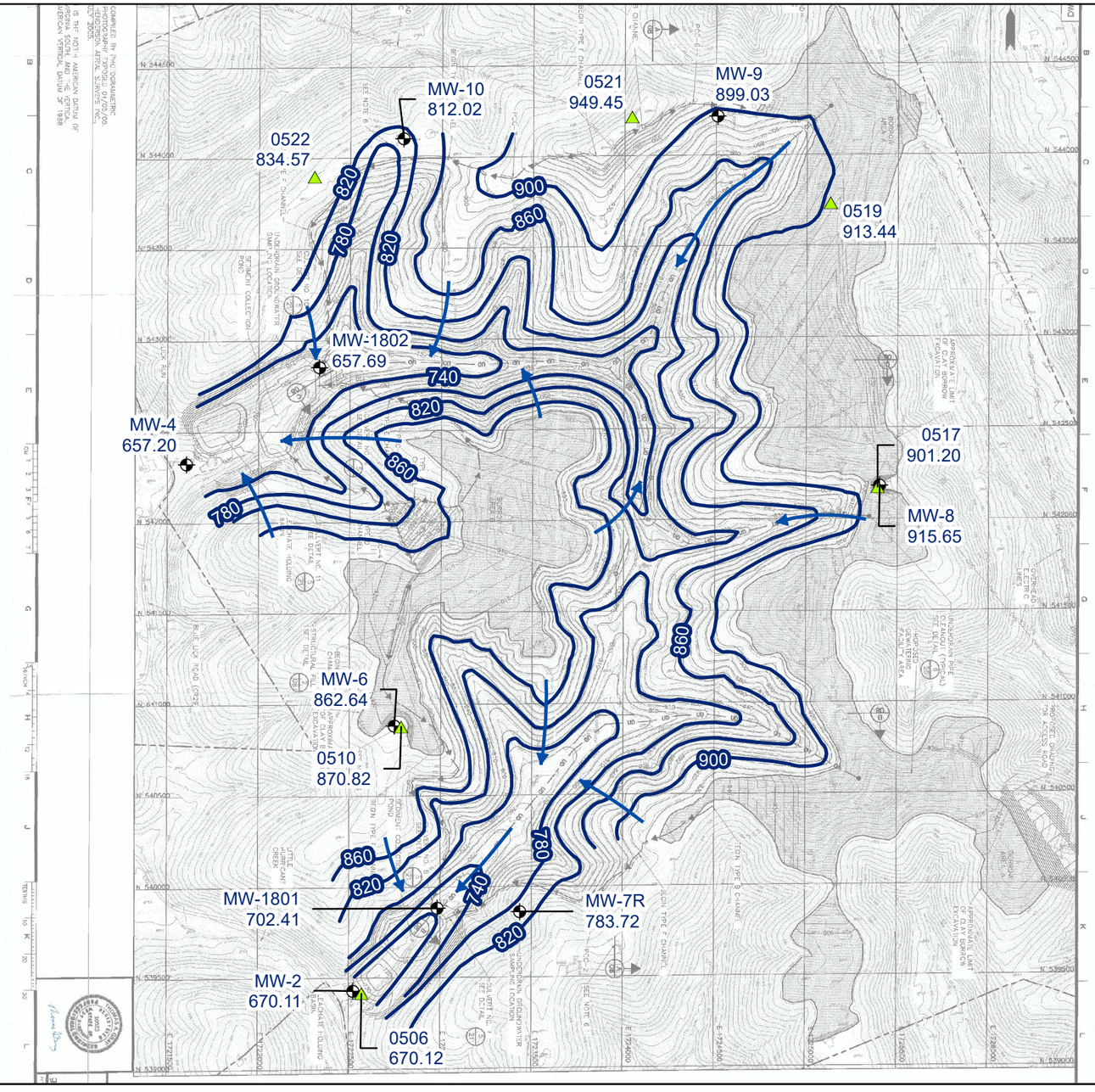
AEP Amos Generating Plant
Winfield, West Virginia

Geosyntec consultants

Columbus, Ohio | 2025/06/17

Figure **X**

A:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Amos\2025\AEP-Amos_Landfill_GW_2024-05_Mayt.mxd. Okiemute.Commander. 6/17/2025. CHA8423/04/08.




**Legend**

- Groundwater Monitoring Well
- Piezometer
- Groundwater Elevation Contour
- Groundwater Flow Direction

**Notes**

1. Monitoring well coordinates and water level data (collected on October 20, 2025) provided by AEP.
2. Topography and drainage system basemap from AEP Drawing No. 13-30500-05-A (topographic contour interval: 10 feet).
3. Groundwater elevation units are feet above mean sea level (ft amsl).

1,000 500 0 1,000 Feet

**Potentiometric Surface Map - Uppermost Aquifer**
**October 2025**

AEP Amos Generating Plant
Winfield, West Virginia

Geosyntec consultants

Columbus, Ohio | 2025/12/02

Figure **X**

A:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Amos\2025\AEP-Amos_Landfill_GW_2025-10Oct.mxd. okiemute.commander. 12/2/2025. CHA8423/04/08.

**APPENDIX 2**

The statistical analysis reports completed in 2025 follow.

Geosyntec consultants

engineers | scientists | innovators

# STATISTICAL ANALYSIS SUMMARY, BACKGROUND UPDATE CALCULATIONS

## Landfill

## John E. Amos Plant

## Winfield, West Virginia

*Prepared for*

**American Electric Power**
1 Riverside Plaza
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Project Number: CHA8500B

January 21, 2025

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## LIST OF ATTACHMENTS

Attachment A: Certification by Qualified Professional Engineer

Attachment B: Statistical Analysis Output

## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ANOVA | analysis of variance |
| CCR | coal combustion residuals |
| CFR | code of federal regulations |
| LPL | lower prediction limit |
| QA/QC | quality assurance and quality control |
| SU | standard units |
| TDS | total dissolved solids |
| UPL | upper prediction limit |
| USEPA | United States Environmental Protection Agency |

# 1. INTRODUCTION

Groundwater monitoring has been conducted at the Landfill, an existing coal combustions residuals (CCR) unit at the John E. Amos Power Plant in Winfield, West Virginia, in accordance with United States Environmental Protection Agency (USEPA) regulations regarding the disposal of CCR in landfills and surface impoundments (Code of Federal Regulations [CFR], Title 40, Section 257, Subpart D, "CCR rule"). It is required under the CCR rule to establish background concentrations for Appendix III parameters in groundwater. These background concentrations are used to calculate prediction limits for future detection monitoring events.

Background concentration values for Appendix III parameters were last calculated for the Landfill in August 2022. Since then, five semiannual detection monitoring events were conducted. This report details how data from these recent groundwater monitoring results were analyzed and incorporated into the Landfill background dataset and provides updated prediction limits.

## 1.1 Previous Monitoring Events and Background Calculations

Before October 2017, at least eight monitoring events were completed to establish background concentrations and calculate prediction limits for Appendix III and Appendix IV parameters under the CCR rule. The data were reviewed for outliers and trends before upper prediction limits (UPLs) were calculated for each Appendix III parameter and lower prediction limits (LPLs) were established for pH. Intrawell prediction limits were initially selected for calcium, chloride, pH, sulfate, and total dissolved solids (TDS), and interwell prediction limits were initially selected for boron and fluoride. After a review of the groundwater geochemistry, intrawell prediction limits were selected for all Appendix III parameters with a one-of-two resampling plan. The statistical analyses completed to establish background levels are detailed in the January 2018 *Statistical Analysis Summary* report (Geosyntec 2018).

Calculated background values should be updated every four to eight measurements, as recommended in the United States Environmental Protection Agency (USEPA) *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance* (USEPA 2009). These updated background concentration values are used to revise the site-specific prediction limits. The prediction limits have previously been updated twice (Geosyntec 2020a; Geosyntec 2022). Additionally, monitoring wells MW-1801 and MW-1802 were added to the groundwater monitoring network to replace MW-1 and MW-5 (Arcadis 2020). Eight samples were collected from MW-1801 and MW-1801 from December 2018 through November 2019 to establish background concentrations for all parameters under the CCR rule (Geosyntec 2020b).

In August 2022, prediction limits for Appendix III parameters were updated with data collected up to March 2022 (Geosyntec 2022). Intrawell testing (using a one-of-two retesting procedure) was selected as the method of analysis and these prediction limits were used for detection monitoring events completed between May 2022 and July 2024.

# 2. STATISTICAL ANALYSIS AND BACKGROUND DATA UPDATE

Five semiannual detection monitoring events were conducted since the last background update (Table 1). Verification sampling was completed (on an individual well or parameter basis) if the initial results for each detection monitoring event identified possible exceedances. Therefore, a minimum of five samples have been collected from each compliance well since the previous background update.

Data from the five semiannual detection monitoring events conducted at the Landfill between May 2022 and July 2024, including both initial and verification results, have been evaluated for inclusion in the background dataset.

The detection monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. The data were reviewed for outliers, and three outliers were removed from the dataset comprised of events conducted between May 2022 and July 2024 prior to analysis. The selected statistical methods have been certified by a qualified professional engineer (Attachment A).

## 2.1 Data Validation and QA/QC

Chemical analysis was completed by an analytical laboratory certified by the National Environmental Laboratory Accreditation Program. Quality assurance and quality control (QA/QC) samples used by the analytical laboratory included laboratory reagent blanks, continuing calibration verification samples, and laboratory fortified blanks.

The analytical data were imported into a Microsoft Access database, where checks were completed to assess the accuracy of sample location identification and analyte identification. Where necessary, unit conversions were applied to standardize reported units across all sampling events. Exported data files were created for use with the Sanitas™ v.10.0.23 statistics software. The export file was checked against the analytical data for transcription errors and completeness. No QA/QC issues that would impact data usability were noted.

## 2.2 Statistical Analysis

Statistical analyses for the Landfill were conducted in accordance with the *Statistical Analysis Plan* (Geosyntec 2020c). These statistical analyses incorporated data from the five semiannual detection monitoring events and associated verification sampling events conducted between May 2022 and July 2024 (Table 1). The complete statistical analysis results are included in Attachment B.

Time series plots of Appendix III parameters (Attachment B) were used to evaluate concentrations over time and to provide an initial screening of suspected outliers and trends. Box plots were also compiled to provide visual representation of variations between wells and within individual wells (Attachment B).

### 2.2.1 Outlier Evaluation

Potential outliers were evaluated using Tukey's outlier test. That is, data points were considered potential outliers if they met one of the following criteria:

$$x_i < \tilde{x}_{0.25} - 3 \times IQR \quad (1)$$

or

$$x_i > \tilde{x}_{0.75} + 3 \times IQR \quad (2)$$

where:

$x_i =$ individual data point
$\tilde{x}_{0.25} =$ first quartile
$\tilde{x}_{0.75} =$ third quartile
$IQR =$ the interquartile range $= \tilde{x}_{0.75} - \tilde{x}_{0.25}$

Data that were evaluated as potential outliers are summarized in Attachment B. While recent sulfate values at MW-1802 were identified by Tukey's as potential outliers, the sulfate values were not flagged nor removed in order to better represent present-day groundwater quality conditions. Three pH values from the May 2022 event measured at wells MW-2 (6.11 standard units [SU]), MW-10 (5.95 SU), and MW-1802 (6.05 SU) were flagged and removed from the dataset to reduce variation and calculate statistical limits representative of present-day conditions.

### 2.2.2 Establishment of Updated Background Dataset

Analysis of variance (ANOVA) was conducted during the initial background screening to assist in evaluating whether intrawell testing is the most appropriate statistical approach for assessing Appendix III parameters. Intrawell tests, which compare compliance data from a single well to background data within the same well, are most appropriate 1) when upgradient wells exhibit spatial variation; 2) when statistical limits constructed from upgradient wells would not be conservative from a regulatory perspective; or 3) when downgradient water quality is not impacted compared to upgradient water quality for the same parameter. It is necessary to update background statistical limits (calculated prediction limits) periodically because natural systems change continuously with physical changes to the environment. For intrawell analyses, data for all wells and constituents are reevaluated when a minimum of four new data points are available. These four (or more) new data points are used to determine whether earlier concentrations are representative of present-day groundwater quality.

Mann-Whitney (Wilcoxon rank-sum) tests were used to compare the medians of historical data (August 2016–March 2022 for wells originally in the network; December 2018–March 2022 for MW-1801 and MW-1802) to the new compliance samples (May 2022–July 2024). Results (Attachment B) were evaluated to determine whether the medians of the two groups were similar at the 99% confidence level. Where no significant difference was found, the new compliance data were added to the background dataset. Where a statistically significant difference was found, the data were reviewed to evaluate the cause of the difference and to assess which was most appropriate: adding newer data to the background dataset, replacing the background dataset with the newer data, or continuing to use the existing background dataset. If the differences appeared to have been caused by a release, then the previous background dataset would continue to be used.

Significant differences were found between the two groups for the following upgradient well/parameter pairs:

- Increases were found for chloride at MW-6 and MW-8.
- A decrease was found for pH at MW-10.

The background datasets for chloride at MW-6 and pH at MW-10 were updated because the magnitudes of the differences were minimal, recent measurements were similar to historical values, and these data represent naturally occurring groundwater quality not impacted by a release. The background dataset for chloride at MW-8 was not updated because recent measurements differed from historical concentrations.

Statistically significant differences were found between the two groups for the following downgradient well/parameter pairs:

- An increase was found for calcium at MW-1802.
- Increases were found for chloride at MW-4, MW-1801, and MW-1802.
- A decrease was found for sulfate at MW-1801.

While an increase in median concentrations was observed in recent measurements for calcium at downgradient well MW-1802, the magnitude of the difference was minimal, and recent measurements were within range of concentrations observed at upgradient wells. The background dataset for sulfate at MW-1801 was updated because recent measurements were similar to or lower than historical values. While an increase in median concentrations was observed in recent measurements for chloride at MW-4, MW-1801, and MW-1802, recent alternative source demonstrations attributed the increases to natural variation (Geosyntec 2023, 2024a, 2024b); therefore, the background dataset was truncated to represent present-day conditions.

After the revised background set was established, a parametric or nonparametric analysis was selected based on the distribution of the data and the frequency of nondetect data. Estimated results less than the practical quantitation limit (PQL)—that is, "J-flagged" data—were considered detections, and the estimated results were used in the statistical analyses. Nonparametric analyses were selected for datasets with at least 50% nondetect data or datasets that could not be normalized. Parametric analyses were selected for datasets (either transformed or untransformed) that passed the Shapiro-Wilk/Shapiro-Francía test for normality. The Kaplan-Meier nondetect adjustment was applied to datasets with between 15% and 50% nondetect data. For datasets with fewer than 15% nondetect data, nondetect data were replaced with one half of the PQL. The selected analysis (i.e., parametric or nonparametric) and transformation (where applicable) for each background dataset are shown in Attachment B.

### 2.2.3 Updated Prediction Limits

Most historical data through July 2024, except as noted above, were used to update the intrawell UPLs (and intrawell LPLs, for pH) and to represent background values (Table 2).

The intrawell UPLs and LPLs were calculated for a one-of-two retesting procedure; that is, if at least one sample in a series of two has no measurement greater than the UPL and if the pH result is greater than or equal to the LPL, then it can be concluded that a statistically significant increase has not occurred. In practice, where the initial result is not greater than the UPL and where the pH result is greater than or equal to the LPL, a second sample will not be collected. The retesting procedures allow an acceptably high statistical power to detect changes at downgradient wells for constituents evaluated with intrawell prediction limits.

## 2.3 Conclusions

Five detection monitoring events were completed between May 2022 and July 2024 in accordance with the CCR rule. Data from these events were included in the new dataset. The laboratory and field data from these events were reviewed prior to statistical analysis, and no QA/QC issues that impacted data usability were identified. Mann-Whitney tests were completed to evaluate whether data from the detection monitoring events could be added to the existing background dataset. Where appropriate, the background datasets were updated, and UPLs and LPLs were recalculated. Intrawell testing (using a one-of-two retesting procedure) was selected as the method of analysis, and testing data were updated for all Appendix III parameters.

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# TABLES

**Table 1. Groundwater Data Summary**
**Statistical Analysis Summary – Background Update Calculations**
**Amos Plant – Landfill**

*Geosyntec Consultants, Inc.*

| Parameter | Unit | MW-2 | | | | | |
|---|---|---|---|---|---|---|---|
| | | 5/24/2022 | 7/27/2022 | 11/1/2022 | 5/26/2023 | 10/17/2023 | 5/9/2024 |
| | | 2022-D1 | 2022-D1-R1 | 2022-D2 | 2023-D1 | 2023-D2 | 2024-D1 |
| Boron | mg/L | 0.227 | -- | 0.215 | 0.187 | 0.217 | 0.185 |
| Calcium | mg/L | 1.82 | -- | 1.89 M1 | 1.52 | 2.20 | 1.66 |
| Chloride | mg/L | 3.39 | -- | 2.93 | 3.55 | 3.39 | 4.25 |
| Fluoride | mg/L | 1.60 | -- | 1.63 | 1.68 | 1.51 | 1.39 |
| Sulfate | mg/L | 9.29 | -- | 8.31 | 9.5 | 8.7 | 8.1 |
| Total Dissolved Solids | mg/L | 370 L1 | -- | 380 | 380 | 360 | 370 |
| pH | SU | 6.1 | 8.7 | 8.8 | 8.7 | 8.5 | 8.6 |

| Parameter | Unit | MW-4 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 5/25/2022 | 7/26/2022 | 11/1/2022 | 2/8/2023 | 5/26/2023 | 10/17/2023 | 5/9/2024 |
| | | 2022-D1 | 2022-D1-R1 | 2022-D2 | 2022-D2-R1 | 2023-D1 | 2023-D2 | 2024-D1 |
| Boron | mg/L | 0.171 | -- | 0.170 | -- | 0.151 | 0.165 | 0.151 |
| Calcium | mg/L | 0.95 | 0.89 | 0.87 | -- | 0.77 | 0.90 M1 | 0.85 |
| Chloride | mg/L | 24.2 | -- | 26.1 | 27.5 | 23.8 | 23.3 | 23.7 |
| Fluoride | mg/L | 1.34 | -- | 1.28 | -- | 1.39 | 1.35 | 1.34 |
| Sulfate | mg/L | 9.79 | -- | 9.39 | -- | 9.8 | 9.5 | 9.3 |
| Total Dissolved Solids | mg/L | 400 L1 | -- | 400 | -- | 400 | 370 | 390 |
| pH | SU | 8.3 | 9.2 | 9.3 | 9.2 | 9.0 | 9.4 | 9.1 |

| Parameter | Unit | MW-6 | | | | | MW-7R | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5/26/2022 | 11/2/2022 | 5/31/2023 | 10/18/2023 | 5/8/2024 | 5/26/2022 | 11/2/2022 | 5/30/2023 | 10/17/2023 | 5/8/2024 |
| | | 2022-D1 | 2022-D2 | 2023-D1 | 2023-D2 | 2024-D1 | 2022-D1 | 2022-D2 | 2023-D1 | 2023-D2 | 2024-D1 |
| Boron | mg/L | 0.092 | 0.099 | 0.091 | 0.096 | 0.094 | 0.092 | 0.087 | 0.071 | 0.082 | 0.095 |
| Calcium | mg/L | 45.5 | 42.3 | 39.1 | 43.4 | 39.5 | 38.5 | 38.8 | 46.8 | 37.2 | 30.4 |
| Chloride | mg/L | 8.63 | 8.56 | 8.84 | 8.44 | 9.30 | 3.87 | 3.89 | 3.55 | 3.62 | 3.62 |
| Fluoride | mg/L | 0.24 | 0.23 | 0.23 | 0.23 | 0.23 | 0.33 | 0.31 | 0.26 | 0.29 | 0.33 |
| Sulfate | mg/L | 19.2 | 23.8 | 19.9 | 30.7 | 23.9 | 219 | 249 | 198 | 225 | 197 |
| Total Dissolved Solids | mg/L | 350 L1 | 360 | 350 | 360 | 350 | 690 L1 | 720 | 650 | 710 | 670 |
| pH | SU | 7.5 | 7.6 | 7.3 | 7.4 | 7.3 | 7.5 | 7.6 | 7.3 | 7.5 | 7.4 |

**Table 1. Groundwater Data Summary**
**Statistical Analysis Summary – Background Update Calculations**
**Amos Plant – Landfill**

*Geosyntec Consultants, Inc.*

| Parameter | Unit | MW-8 | | | | | MW-9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5/26/2022 | 11/2/2022 | 5/30/2023 | 10/17/2023 | 5/9/2024 | 5/26/2022 | 11/3/2022 | 5/31/2023 | 10/17/2023 | 5/8/2024 |
| | | 2022-D1 | 2022-D2 | 2023-D1 | 2023-D2 | 2024-D1 | 2022-D1 | 2022-D2 | 2023-D1 | 2023-D2 | 2024-D1 |
| Boron | mg/L | 0.020 J1 | 0.023 J1 | 0.045 J1 | 0.023 J1 | 0.022 J1 | 0.052 | 0.064 | 0.041 J1 | 0.052 | 0.066 |
| Calcium | mg/L | 102 | 107 | 125 | 112 | 97.7 | 99.4 | 84.7 M1 | 74.3 | 60.6 | 71.2 |
| Chloride | mg/L | 63.8 | 76.8 | 87.4 | 73.5 | 67.2 | 4.78 | 4.77 | 3.66 | 3.67 | 4.38 |
| Fluoride | mg/L | 0.17 | 0.16 | 0.15 | 0.15 | 0.17 | 0.21 | 0.22 | 0.20 | 0.22 | 0.22 |
| Sulfate | mg/L | 76.3 | 79.9 | 97.7 | 98.3 | 125 | 33.9 | 31.1 | 27.7 | 28.1 | 28.2 |
| Total Dissolved Solids | mg/L | 560 L1 | 580 | 630 | 590 | 640 | 410 L1 | 420 | 400 | 380 | 410 |
| pH | SU | 7.4 | 7.0 | 7.0 | 7.0 | 7.3 | 7.7 | 7.2 | 6.9 | 7.1 | 7.0 |

| Parameter | Unit | MW-10 | | | | |
|---|---|---|---|---|---|---|
| | | 5/25/2022 | 11/3/2022 | 5/30/2023 | 10/18/2023 | 5/14/2024 |
| | | 2022-D1 | 2022-D2 | 2023-D1 | 2023-D2 | 2024-D1 |
| Boron | mg/L | 0.083 | 0.088 | 0.074 | 0.068 | 0.040 J1 |
| Calcium | mg/L | 1.44 | 1.68 | 1.12 | 1.96 | 0.74 |
| Chloride | mg/L | 4.10 | 5.60 | 4.32 | 5.22 | 5.07 |
| Fluoride | mg/L | 0.51 | 0.65 | 0.59 | 0.57 | 0.38 |
| Sulfate | mg/L | 14.1 | 14.4 | 14.1 | 15.2 | 13.8 |
| Total Dissolved Solids | mg/L | 510 L1 | 520 | 510 | 450 | 470 |
| pH | SU | 6.0 | 7.5 | 8.6 | 8.4 | 8.4 |

| Parameter | Unit | MW-1801 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5/25/2022 | 7/27/2022 | 11/1/2022 | 2/8/2023 | 5/31/2023 | 7/19/2023 | 10/17/2023 | 1/26/2024 | 5/9/2024 | 7/16/2024 |
| | | 2022-D1 | 2022-D1-R1 | 2022-D2 | 2022-D2-R1 | 2023-D1 | 2023-D1-R1 | 2023-D2 | 2023-D2-R1 | 2024-D1 | 2024-D1-R1 |
| Boron | mg/L | 0.265 | -- | 0.253 | -- | 0.220 | -- | 0.239 | -- | 0.225 | -- |
| Calcium | mg/L | 1.78 | -- | 1.57 | -- | 1.47 | -- | 1.76 | -- | 1.68 | -- |
| Chloride | mg/L | 14.4 | 14.0 | 15.0 | 14.2 | 14.9 | 15.3 | 15.2 | 14.2 | 16.2 | 16.3 |
| Fluoride | mg/L | 5.22 | -- | 5.38 | -- | 5.32 | -- | 5.13 | -- | 5.28 | -- |
| Sulfate | mg/L | 5.42 | -- | 5.66 | -- | 4.6 | -- | 5.3 | -- | 4.6 | -- |
| Total Dissolved Solids | mg/L | 510 L1 | -- | 520 | -- | 510 | -- | 510 | -- | 510 | -- |
| pH | SU | 8.4 | 8.8 | 8.9 | 8.8 | 8.6 | 8.8 | 8.7 | 8.8 | 8.7 | 8.9 |

**Table 1. Groundwater Data Summary**
**Statistical Analysis Summary – Background Update Calculations**
**Amos Plant – Landfill**

*Geosyntec Consultants, Inc.*

| Parameter | Unit | MW-1802 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5/25/2022 | 7/27/2022 | 11/4/2022 | 2/8/2023 | 5/26/2023 | 7/19/2023 | 10/17/2023 | 1/26/2024 | 5/9/2024 | 7/17/2024 |
| | | 2022-D1 | 2022-D1-R1 | 2022-D2 | 2022-D2-R1 | 2023-D1 | 2023-D1-R1 | 2023-D2 | 2023-D2-R1 | 2024-D1 | 2024-D1-R1 |
| Boron | mg/L | 0.273 | -- | 0.261 | -- | 0.221 | -- | 0.247 | -- | 0.226 | -- |
| Calcium | mg/L | 1.14 | 1.16 | 1.13 | 0.99 | 0.82 | -- | 1.14 | 1.16 | 1.10 | 1.12 |
| Chloride | mg/L | 17.0 | 14.9 | 17.0 | 16.8 | 17.2 | 16.3 | 12.9 | -- | 12.6 | -- |
| Fluoride | mg/L | 4.71 | -- | 4.86 | -- | 4.99 | -- | 5.01 | -- | 5.33 | 5.13 |
| Sulfate | mg/L | 19.0 | -- | 18.2 | -- | 19.3 | -- | 32.8 | 29.4 | 36.2 | 24.9 |
| Total Dissolved Solids | mg/L | 520 L1 | -- | 510 | -- | 510 | -- | 480 | -- | 500 | -- |
| pH | SU | 6.1 | 9.1 | 9.2 | 8.8 | 8.9 | 9.1 | 9.2 | 9.0 | 9.0 | 9.0 |

Notes:
--: not measured
D1: first semi-annual detection monitoring event of the year
D2: second semi-annual detection monitoring event of the year
J1: estimated value. Parameter was detected in concentrations below the reporting limit
L1: the associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits
M1: the associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits
mg/L: milligrams per liter
R1: first verification event associated with detection monitoring round
SU: standard unit
U1: parameter was not present in concentrations above the method detection limit and is reported as the reporting limit

**Table 2. Background Level Summary**
**Statistical Analysis Summary – Background Update Calculations**
**Amos Plant – Landfill**

| Analyte | Unit | Description | MW-2 | MW-4 | MW-1801 | MW-1802 |
|---|---|---|---|---|---|---|
| Boron | mg/L | Intrawell Background Value (UPL) | 0.241 | 0.202 | 0.279 | 0.280 |
| Calcium | mg/L | Intrawell Background Value (UPL) | 2.52 | 0.939 | 1.83 | 1.22 |
| Chloride | mg/L | Intrawell Background Value (UPL) | 5.08 | 29.1 | 16.9 | 17.2 |
| Fluoride | mg/L | Intrawell Background Value (UPL) | 1.75 | 1.53 | 5.52 | 5.30 |
| pH | SU | Intrawell Background Value (UPL) | 8.9 | 9.8 | 9.2 | 9.4 |
| | | Intrawell Background Value (LPL) | 8.3 | 8.6 | 8.5 | 8.7 |
| Sulfate | mg/L | Intrawell Background Value (UPL) | 11.6 | 11.3 | 9.20 | 36.2 |
| Total Dissolved Solids | mg/L | Intrawell Background Value (UPL) | 394 | 417 | 552 | 536 |

Notes:
LPL: lower prediction limit
mg/L: milligrams per liter
SU: standard units
UPL: upper prediction limit

# ATTACHMENT A
## Certification by Qualified Professional Engineer

**Certification by Qualified Professional Engineer**

I certify that selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Amos Landfill CCR management area and that the requirements of 40 CFR 257.93(f) have been met.


David Anthony Miller

Printed Name of Licensed Professional Engineer

Signature

| 22663 | West Virginia | 01.31.2025 |
|---|---|---|
| License Number | Licensing State | Date |

# ATTACHMENT B
## Statistical Analysis Output

GROUNDWATER STATS CONSULTING

November 18, 2024

Geosyntec Consultants
Attn: Ms. Allison Kreinberg
500 W. Wilson Bridge Road, Ste. 250
Worthington, OH 43085

RE: Amos Landfill Background Update - 2024

Dear Ms. Kreinberg,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the background update of the groundwater data through 2024 at American Electric Power's Amos Landfill. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals from Electric Utilities (CCR Rule, 2015) as well as with the USEPA Unified Guidance (2009).

Sampling began at Amos Landfill for the CCR program in 2016 for all wells except wells MW-1801 and MW-1802 which were installed in 2018, and at least 8 background samples have been collected at each of the groundwater monitoring wells. The monitoring well network, as provided by Geosyntec Consultants, includes the following:

- **Upgradient wells:** LF-MW-6, LF-MW-7R, LF-MW-8, LF-MW-9, and LF-MW-10
- **Downgradient wells:** LF-MW-2, LF-MW-4, MW-1801, and MW-1802

Data were sent electronically to Groundwater Stats Consulting, and the statistical analysis was reviewed by Dr. Jim Loftis, Civil & Environmental Engineering professor emeritus at Colorado State University and Senior Advisor to Groundwater Stats Consulting. The statistical analysis was performed according to the groundwater data screening that was performed in April 2018 by GSC and approved by Dr. Cameron, PhD Statistician with MacStat Consulting and primary author of the USEPA Unified Guidance.

The following constituents were evaluated during this background update:

- **Appendix III parameters** – boron, calcium, chloride, fluoride, pH, sulfate, and TDS

Time series plots for Appendix III parameters at all wells are provided for the purpose of updating prediction limits at these wells (Figure A). Additionally, box plots are included for all constituents at upgradient and downgradient wells (Figure B). The time series plots are used to initially screen for suspected outliers and trends, while the box plots provide visual representation of variation within individual wells and between all wells.

Data at existing wells were originally evaluated during the background screening conducted in March 2018 for Appendix III parameters (summarized below) for the following: 1) outliers; 2) trends; 3) most appropriate statistical method for Appendix III parameters based on site characteristics of groundwater data upgradient of the facility; and 4) eligibility of downgradient wells when intrawell statistical methods are recommended. Power curves were provided with the previous screening to demonstrate that the selected statistical methods for Appendix III parameters comply with the USEPA Unified Guidance recommendations as discussed below.

**Summary of Statistical Methods:**

- Intrawell prediction limits, combined with a 1-of-2 resample plan for boron, calcium, chloride, fluoride, pH, sulfate and TDS

Parametric prediction limits are utilized when the screened historical data follow a normal or transformed-normal distribution. When data cannot be normalized or the majority of data are non-detects, a nonparametric test is utilized. The distribution of data is tested using the Shapiro-Wilk/Shapiro-Francia test for normality. After testing for normality and performing any adjustments as discussed below (US EPA, 2009), data are analyzed using either parametric or non-parametric prediction limits.

- No statistical analyses are required on wells and analytes containing 100% non-detects (USEPA Unified Guidance, 2009, Chapter 6).
- When data contain <15% non-detects in background, simple substitution of one-half the reporting limit is utilized in the statistical analysis. The reporting limit utilized for non-detects is the practical quantification limit (PQL) as reported by the laboratory.
- When data contain between 15-50% non-detects, the Kaplan-Meier non-detect adjustment is applied to the background data. This technique adjusts the mean

and standard deviation of the historical concentrations to account for concentrations below the reporting limit.
- Nonparametric prediction limits are used on data containing greater than 50% non-detects.

**Summary of Original Background Screening – April 2018**

Outlier Evaluation

Time series plots are used to identify suspected outliers, or extreme values that would result in limits that are not influenced by spurious values in proposed background data. Suspected outliers at existing wells for Appendix III parameters were formally tested using Tukey's box plot method and, when identified, flagged in the computer database with "o" and deselected prior to construction of statistical limits. A summary of these results was included in the previous screening.

No seasonal patterns were observed on the time series plots for any of the detected data; therefore, no deseasonalizing adjustments were made to the data. When seasonal patterns are observed, data may be deseasonalized so that the resulting limits will correctly account for the seasonality as a predictable pattern rather than random variation or a release.

While trends may be visual, a quantification of the trend and its significance is needed. The Sen's Slope/Mann Kendall trend test was used to evaluate all data at each well to identify statistically significant increasing or decreasing trends. In the absence of suspected contamination, significant trending data are typically not included as part of the background data used for construction of prediction limits. This step serves to eliminate the trend and, thus, reduce variation in background. When statistically significant decreasing trends are present, earlier data are evaluated to determine whether earlier concentration levels are significantly different than current reported concentrations and will be deselected as necessary. When the historical records of data are truncated for the reasons above, a summary report will be provided to show the date ranges used in construction of the statistical limits.

The results of the trend analyses showed Appendix III concentrations were stable over time with no statistically significant increasing or decreasing trends. A summary table of the trend test results accompanied the trend tests. Therefore, none of the data sets required any adjustments at that time.

Determination of Statistical Method - Appendix III Parameters

The Analysis of Variance (ANOVA) was used to statistically evaluate differences in average concentrations among upgradient wells, which assists in identifying the most appropriate statistical approach. When variation exists among upgradient wells, intrawell methods, which used historical data within a given well to establish a limit for comparison of future compliance data at the same well, are recommended as the most appropriate statistical method when groundwater downgradient of the facility is not affected by practices at the facility.

Intrawell limits constructed from carefully screened background data from within each well serve to provide statistical limits will rapidly identify a change in more recent compliance data from within a given well. This statistical method removes the element of variation from across wells and eliminates the chance of mistaking natural spatial variation for a release from the facility. Prior to performing intrawell prediction limits, several steps were required to reasonably demonstrate downgradient water quality does not have existing impacts from the practices of the facility.

Exploratory data analysis was used as a general comparison of concentrations in downgradient wells for all Appendix III parameters recommended for intrawell analyses to concentrations reported in upgradient wells. Upper tolerance limits were used in conjunction with confidence intervals to determine whether the estimated averages in downgradient wells are higher than observed levels upgradient of the facility. The upper tolerance limits were constructed to represent the extreme upper range of possible background levels at the site.

In cases where downgradient average concentrations are higher than observed concentrations upgradient for a given constituent, an independent study and hydrogeological investigation would be required to identify local geochemical conditions and expected groundwater quality for the region to justify an intrawell approach. Such an assessment is beyond the scope of services provided by Groundwater Stats Consulting. When there is not an obvious explanation for observed concentration differences in downgradient wells relative to reported concentrations in upgradient wells, interwell prediction limits were initially be selected for the statistical method until further evidence shows that concentrations are due to natural variation rather than a result of the facility.

Parametric tolerance limits were constructed with a target of 99% confidence and 95% coverage using pooled upgradient well data for each of the Appendix III parameters. The confidence and coverage levels for nonparametric tolerance limits are dependent upon

the number of background samples. As more data are collected, the background population is better represented and the confidence and coverage levels increase.

Confidence intervals were constructed on downgradient wells for each of the Appendix III parameters, using the tolerance limits discussed above, to determine intrawell eligibility. When the entire confidence interval is above a background standard for a given parameter, interwell methods are initially recommended as the statistical method. Therefore, only parameters with confidence intervals which did not exceed background standards were eligible for intrawell prediction limits.

Confidence intervals for the majority of parameters were found to be within their respective background limits. Additionally, evidence provided by Geosyntec supported the use of intrawell analyses for all parameters at all wells based on additional studies conducted.

All available data through October 2017 at each well were used to establish intrawell background limits for each of the Appendix III parameters based on a 1-of-2 resample plan that will be used for future comparisons. Future compliance observations at each well will be compared to these background limits during each subsequent semi-annual sampling event.

**Background Update Summary – May/July 2024**

Data sets were previously evaluated in July 2022 for updating background limits at existing wells, and all records were updated using data through March 2022. A summary of those findings was submitted at that time.

Prior to updating background data during this analysis, samples were re-evaluated for all wells using Tukey's outlier test and visual screening on data collected through May/July 2024 (Figure C).

Tukey's test identified several values as outliers, and previously flagged values were confirmed by visual screening and Tukey's outlier tests. Among the values identified by Tukey's test, all values except the more recent concentrations identified for sulfate at downgradient well LF-MW-1802 were considerably higher (or lower) than all measurements within their records and were flagged during this analysis in order to reduce variation and to construct statistical limits that are better representative of present-day groundwater quality conditions. Although not identified by Tukey's test, the lowest value for sulfate at upgradient well LF-MW-8 was flagged for similar reasons. Any

values identified by Tukey's, but not flagged in the database appeared to represent natural variation.

As mentioned above, flagged data are displayed in a lighter font and as a disconnected symbol on the time series reports, as well as in a lighter font on the accompanying data pages. An updated summary of Tukey's test results and flagged outliers follows this letter (Figure C).

Mann-Whitney Test

The Mann-Whitney (Wilcoxon Rank Sum) test was used to compare the medians of historical data for existing wells through March 2022 to the new compliance samples at each existing well through May/July 2024 to evaluate whether the groups are statistically similar at the 99% confidence level, in which case background data may be updated with compliance data (Figure D). Statistically significant differences were found between the two groups for the following well/constituent pairs:

Increasing:

- Calcium: LF-MW-1802
- Chloride: LF-MW-6, LF-MW-8 (both upgradient), LF-MW-4, LF-MW-1801, and LF-MW-1802

Decreasing:

- pH: LF-MW-10 (upgradient)
- Sulfate: LF-MW-1801

Typically, when the test concludes that the medians of the two groups are significantly different, particularly in the downgradient wells, the background is not updated to include the newer data but will be reconsidered in the future unless it can be reasonably determined that the newer measurements are representative of changes in groundwater quality unrelated to practices at the site.

While the medians of the two groups were statistically significantly different for pH at upgradient well LF-MW-10 and sulfate at downgradient well LF-MW-1801, the majority of the recently reported measurements were similar to or lower than those reported historically and would result in statistical limits that are more representative of present-day groundwater quality. In the case of calcium at downgradient well LF-MW-1802 and chloride at upgradient well LF-MW-6, the more recent concentrations are only slightly higher than those reported in background, are relatively low magnitude, and are similar to recent reported concentrations in at least one upgradient well.

Although a statistically significant increase in median concentrations was identified for chloride at downgradient wells LF-MW-4, LF-MW-1801, and LF-MW-1802, geochemistry studies conducted by Geosyntec Consultants, reportedly, indicate changing concentrations at this site are due to natural variation in groundwater quality for chloride at these wells. Therefore, earlier data for these records were truncated to reduce variation in the record and to use the most recent 8 concentrations, which are relatively stable and non-trending. While not statistically significant at a significance level of 0.01, there is an apparent increase in sulfate concentrations for the most recent three observations at downgradient well LF-MW-1802. Since the recent concentrations are lower than those in multiple upgradient wells, this record was updated.

Among well/constituent pairs with statistically significant increases in concentrations, chloride at upgradient well LF-MW-8 was not updated through July 2024. This record was not updated due to more recent concentrations not being within the range of historic concentrations and being multiple standard deviations higher than existing background concentrations. If further investigation determines that the observed increase for chloride at this well is representative of current groundwater quality conditions, this record may be updated in the future. A list of well/constituent pairs that use a truncated portion of their record follows this letter. All other records were updated with available data through May/July 2024. A summary of the Mann-Whitney test results follows this letter.

Prediction Limits

Intrawell prediction limits using all historical data through May/July 2024, combined with a 1-of-2 resample plan, were constructed, and a summary of the updated limits follows this letter (Figure E). Future compliance observations at each well will be compared to these background limits during each subsequent semi-annual sampling event.

Thank you for the opportunity to assist you in the statistical analysis of groundwater quality for the Amos Landfill. If you have any questions or comments, please feel free to contact us.

For Groundwater Stats Consulting,

Abdul Diane
Groundwater Analyst

Andrew T. Collins
Project Manager

# Date Ranges

Date: 11/15/2024 1:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF

Chloride (mg/L)

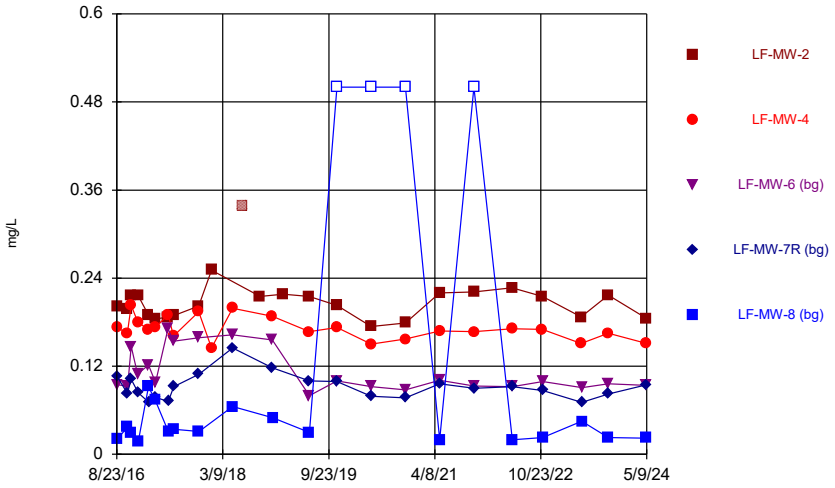
- LF-MW-4 background:11/4/2021-5/9/2024
- LF-MW-8 overall:8/24/2016-11/3/2021
- LF-MW-1801 background:5/25/2022-7/16/2024
- LF-MW-1802 background:7/21/2021-5/9/2024

FIGURE A

Time Series

Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

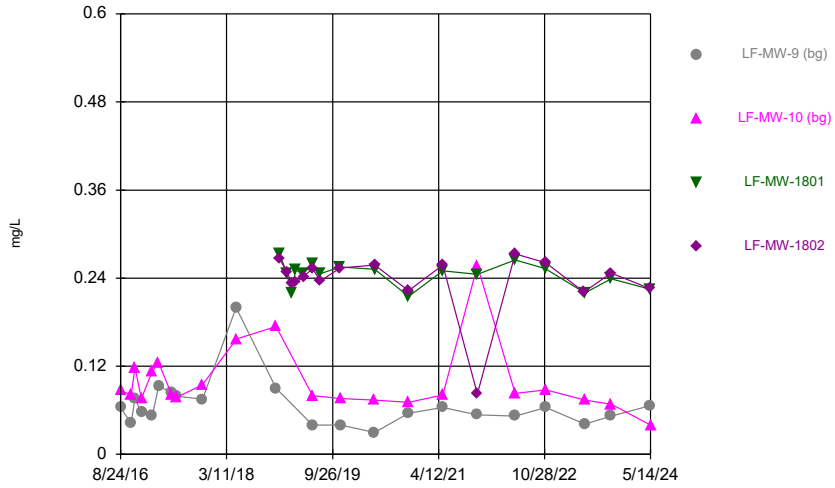
Time Series




Constituent: Boron Analysis Run 11/18/2024 8:31 AM
Amos Landfill Client: Geosyntec Data: Amos LF

Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

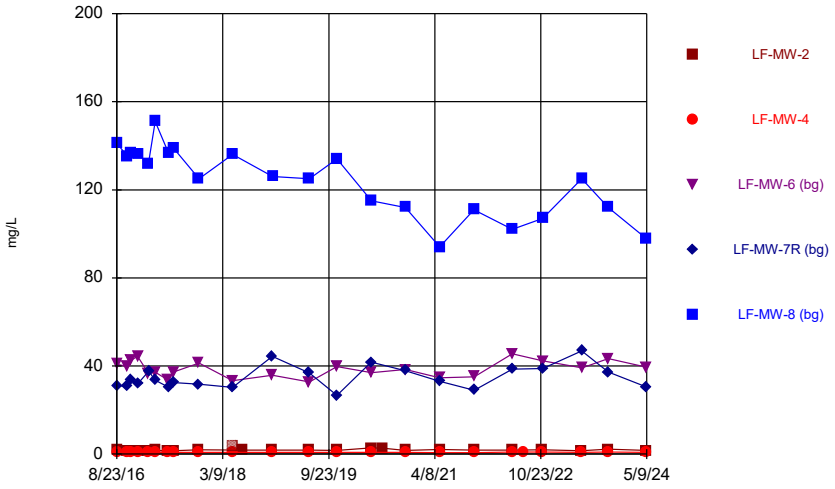
Time Series




Constituent: Boron Analysis Run 11/18/2024 8:32 AM
Amos Landfill Client: Geosyntec Data: Amos LF

Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

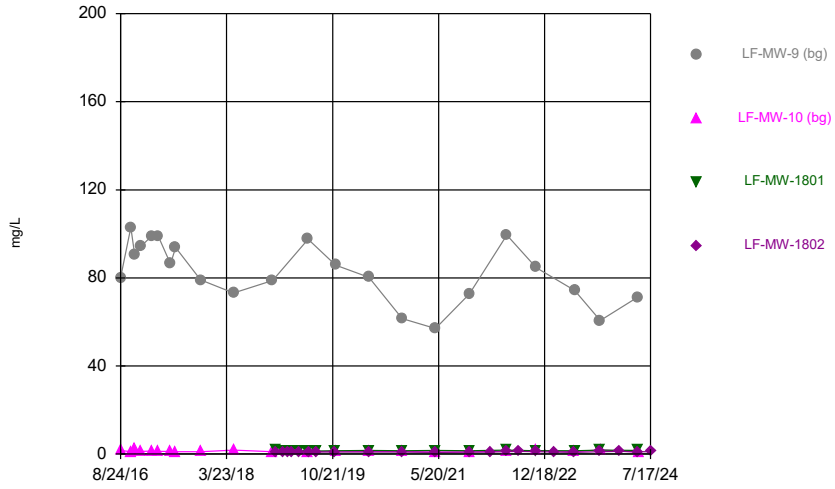
Time Series




Constituent: Calcium Analysis Run 11/18/2024 8:32 AM
Amos Landfill Client: Geosyntec Data: Amos LF

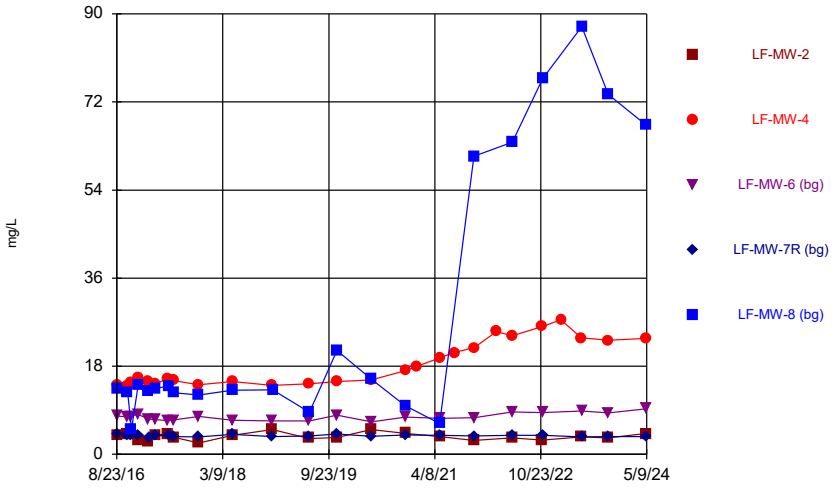
Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

Time Series




Constituent: Calcium Analysis Run 11/18/2024 8:32 AM
Amos Landfill Client: Geosyntec Data: Amos LF

## Time Series

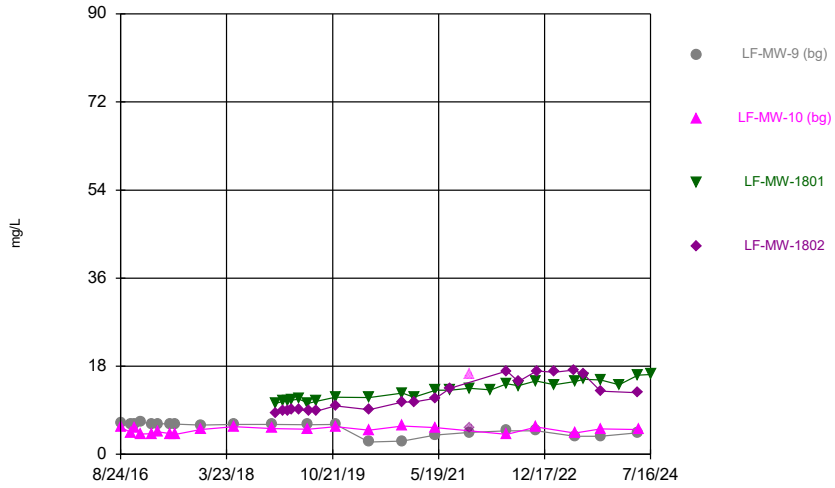



Constituent: Chloride Analysis Run 11/18/2024 8:32 AM

Amos Landfill Client: Geosyntec Data: Amos LF

Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

## Time Series

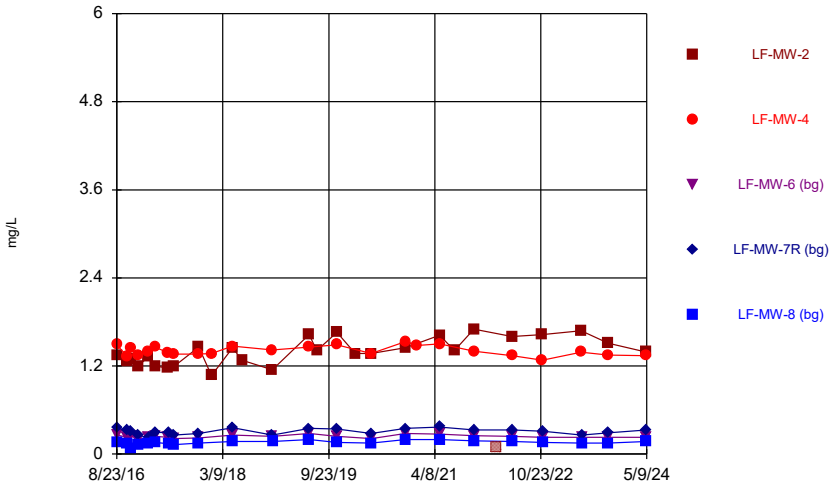



Constituent: Chloride Analysis Run 11/18/2024 8:32 AM

Amos Landfill Client: Geosyntec Data: Amos LF

Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

## Time Series

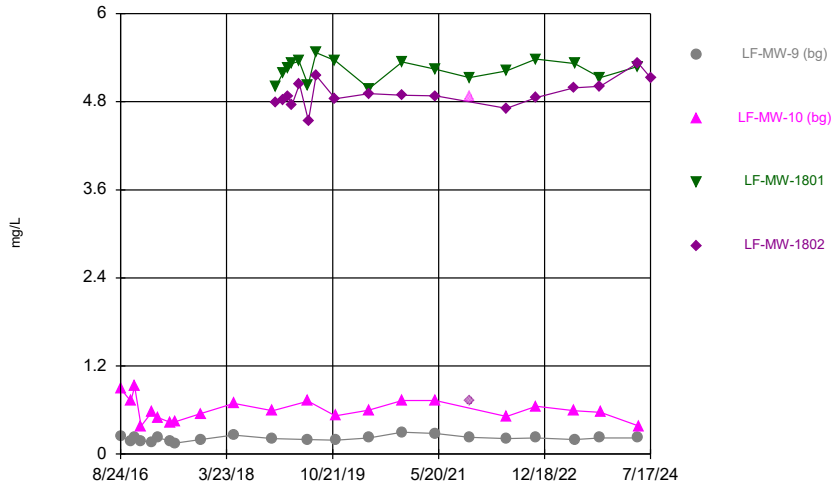



Constituent: Fluoride Analysis Run 11/18/2024 8:32 AM

Amos Landfill Client: Geosyntec Data: Amos LF

Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

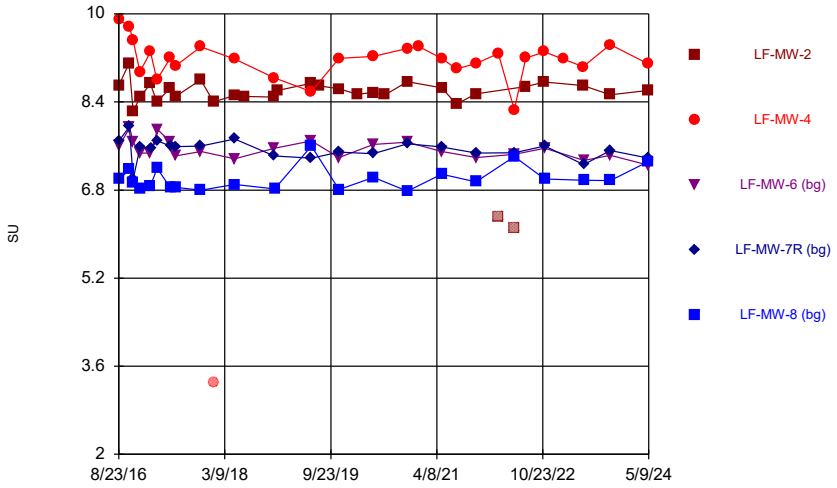
## Time Series




Constituent: Fluoride Analysis Run 11/18/2024 8:32 AM

Amos Landfill Client: Geosyntec Data: Amos LF

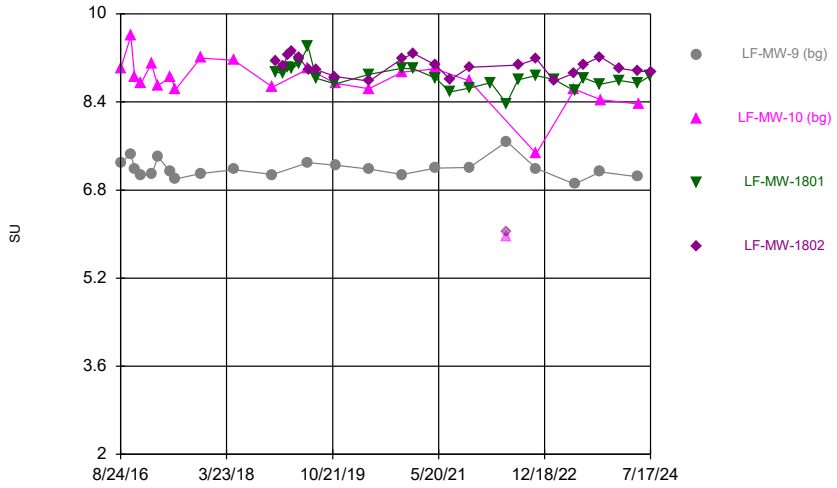
## Time Series




Constituent: pH, field Analysis Run 11/18/2024 8:32 AM
Amos Landfill Client: Geosyntec Data: Amos LF

Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

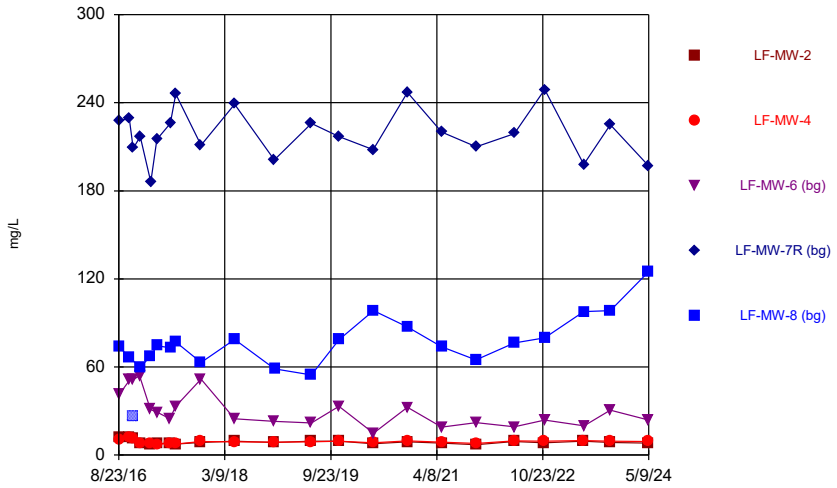
## Time Series




Constituent: pH, field Analysis Run 11/18/2024 8:32 AM
Amos Landfill Client: Geosyntec Data: Amos LF

Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

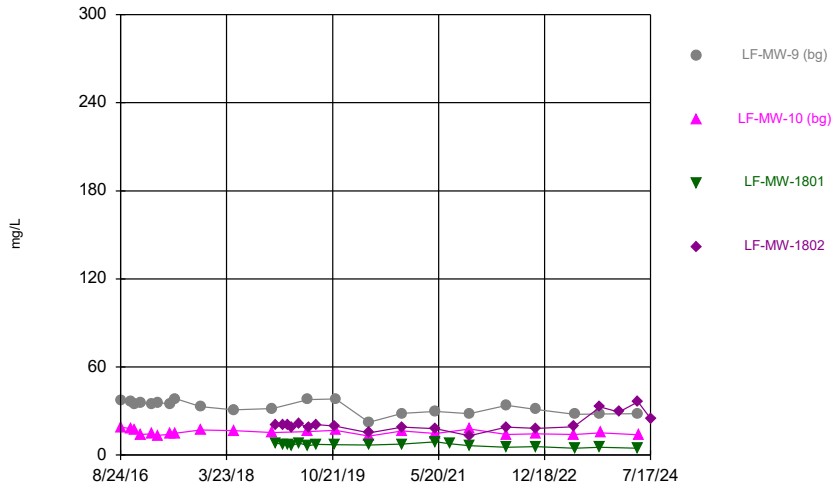
## Time Series




Constituent: Sulfate Analysis Run 11/18/2024 8:32 AM
Amos Landfill Client: Geosyntec Data: Amos LF

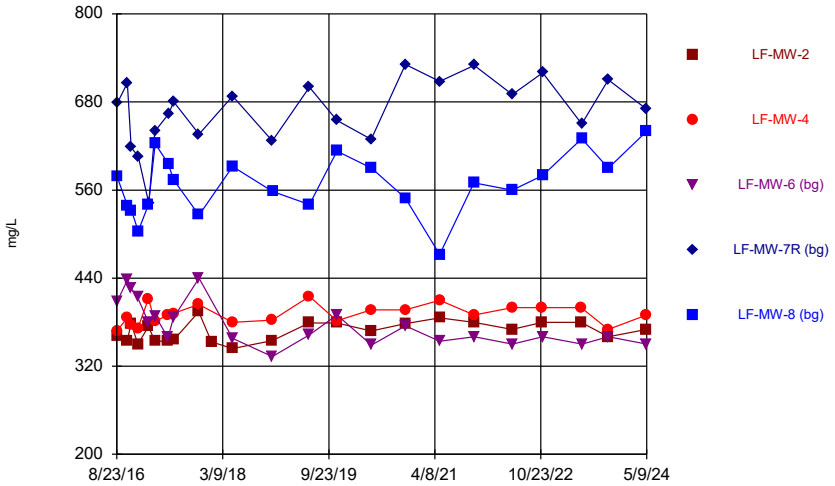
Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

## Time Series




Constituent: Sulfate Analysis Run 11/18/2024 8:32 AM
Amos Landfill Client: Geosyntec Data: Amos LF

## Time Series

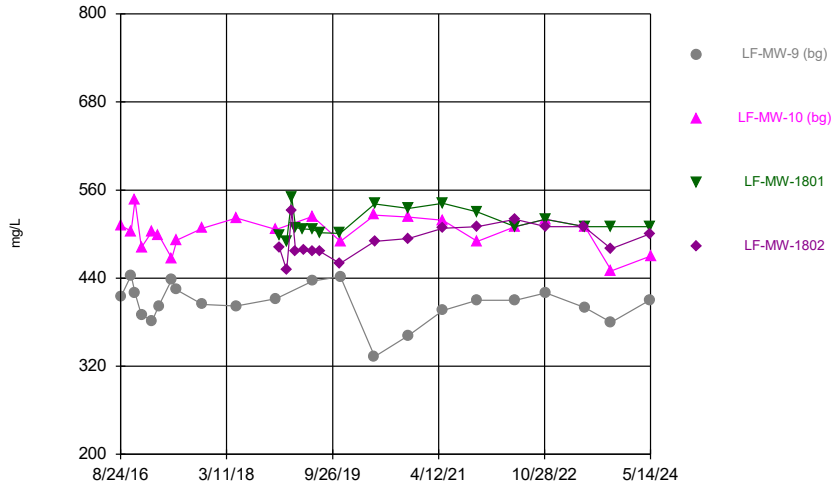



Constituent: Total Dissolved Solids Analysis Run 11/18/2024 8:32 AM

Amos Landfill Client: Geosyntec Data: Amos LF

Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

## Time Series



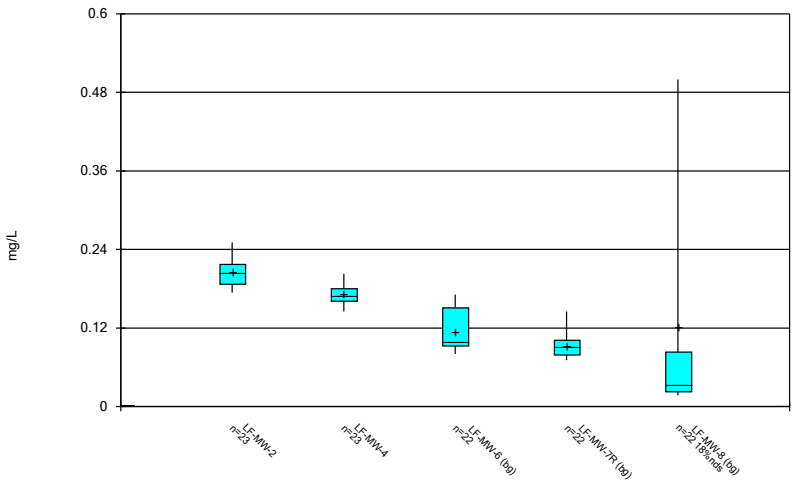

Constituent: Total Dissolved Solids Analysis Run 11/18/2024 8:32 AM

Amos Landfill Client: Geosyntec Data: Amos LF

FIGURE B

Box Plots

## Box & Whiskers Plot

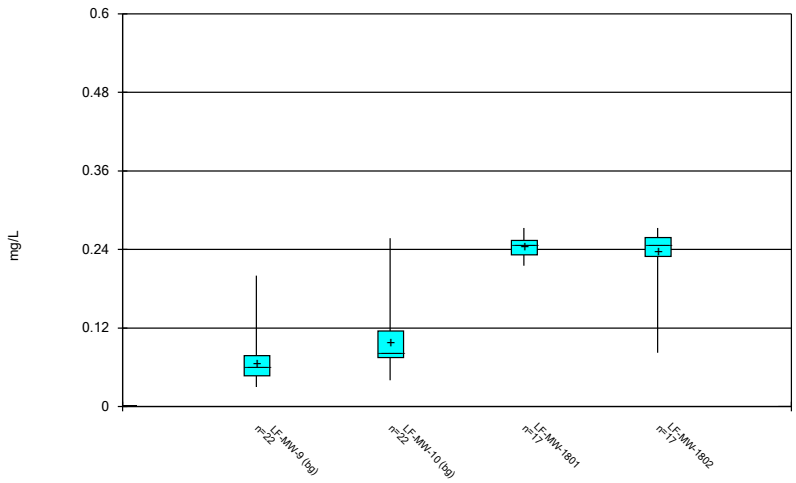



Constituent: Boron Analysis Run 11/18/2024 8:42 AM

Amos Landfill Client: Geosyntec Data: Amos LF

Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

## Box & Whiskers Plot

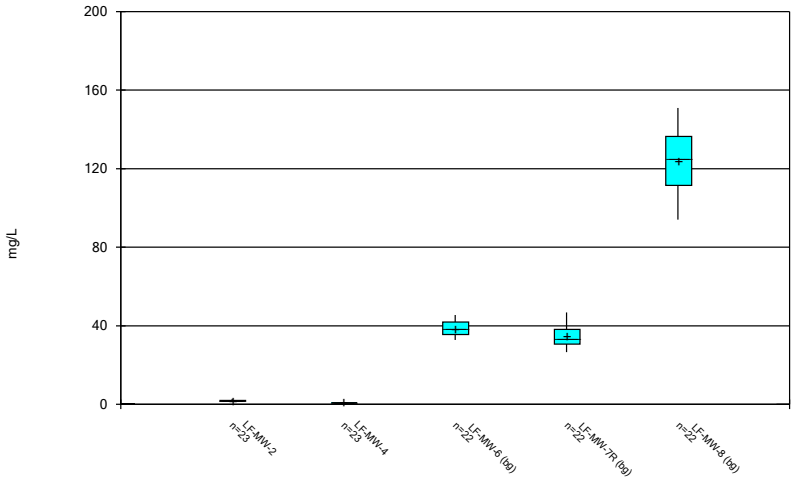



Constituent: Boron Analysis Run 11/18/2024 8:42 AM

Amos Landfill Client: Geosyntec Data: Amos LF

Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

## Box & Whiskers Plot

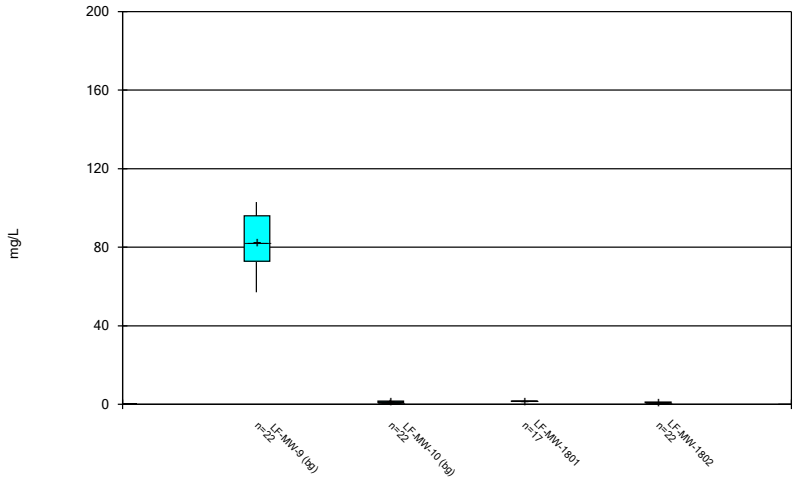



Constituent: Calcium Analysis Run 11/18/2024 8:42 AM

Amos Landfill Client: Geosyntec Data: Amos LF

Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

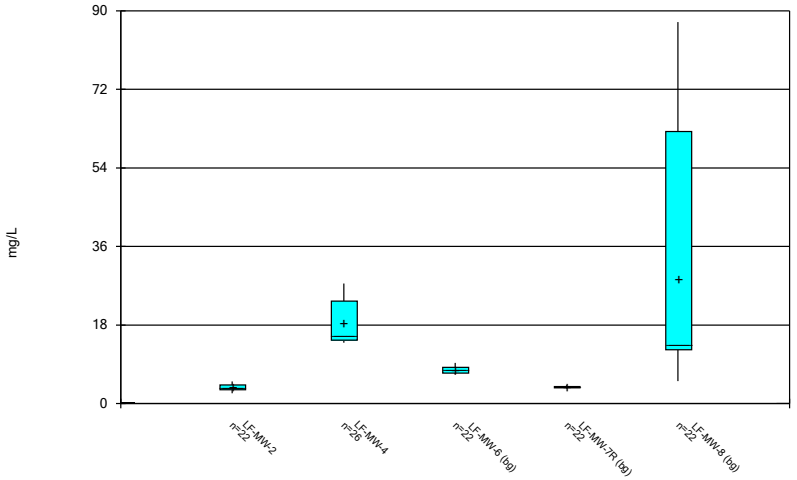
## Box & Whiskers Plot




Constituent: Calcium Analysis Run 11/18/2024 8:42 AM

Amos Landfill Client: Geosyntec Data: Amos LF

## Box & Whiskers Plot

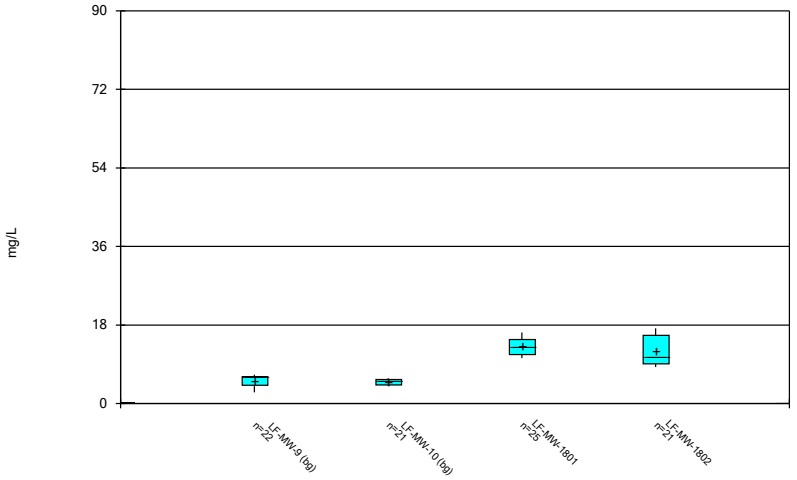



Constituent: Chloride Analysis Run 11/18/2024 8:42 AM

Amos Landfill Client: Geosyntec Data: Amos LF

Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

## Box & Whiskers Plot

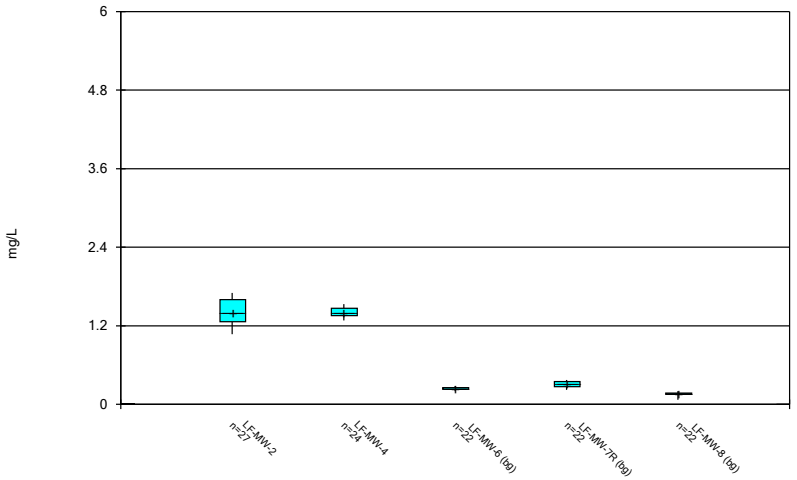



Constituent: Chloride Analysis Run 11/18/2024 8:42 AM

Amos Landfill Client: Geosyntec Data: Amos LF

Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

## Box & Whiskers Plot

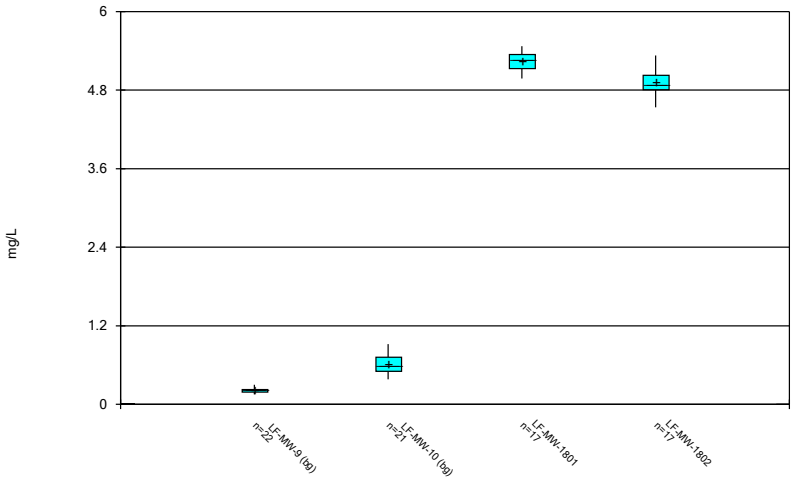



Constituent: Fluoride Analysis Run 11/18/2024 8:42 AM

Amos Landfill Client: Geosyntec Data: Amos LF

Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

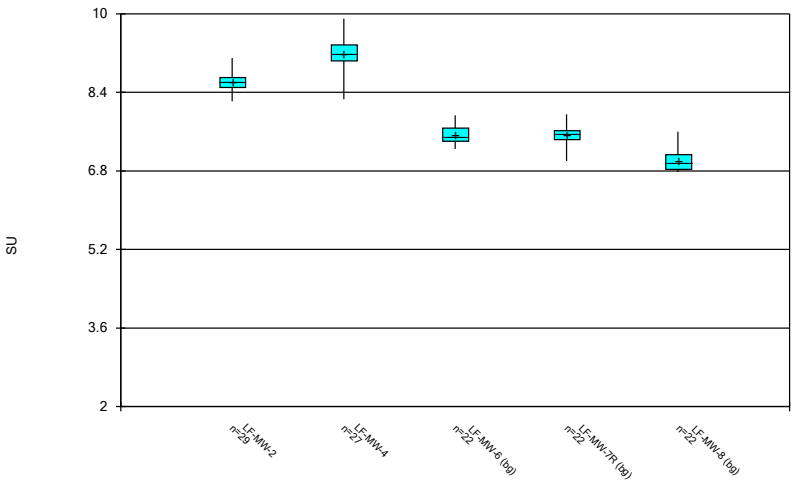
## Box & Whiskers Plot




Constituent: Fluoride Analysis Run 11/18/2024 8:42 AM

Amos Landfill Client: Geosyntec Data: Amos LF

## Box & Whiskers Plot

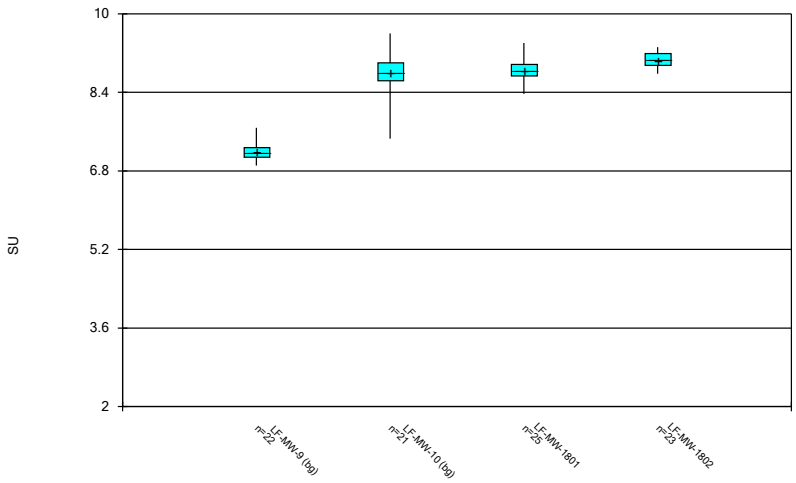



Constituent: pH, field Analysis Run 11/18/2024 8:42 AM

Amos Landfill Client: Geosyntec Data: Amos LF

Sanitas™ v.10.0.23a Software licensed to Groundwater Stats Consulting. UG

## Box & Whiskers Plot




Constituent: pH, field Analysis Run 11/18/2024 8:42 AM

Amos Landfill Client: Geosyntec Data: Amos LF

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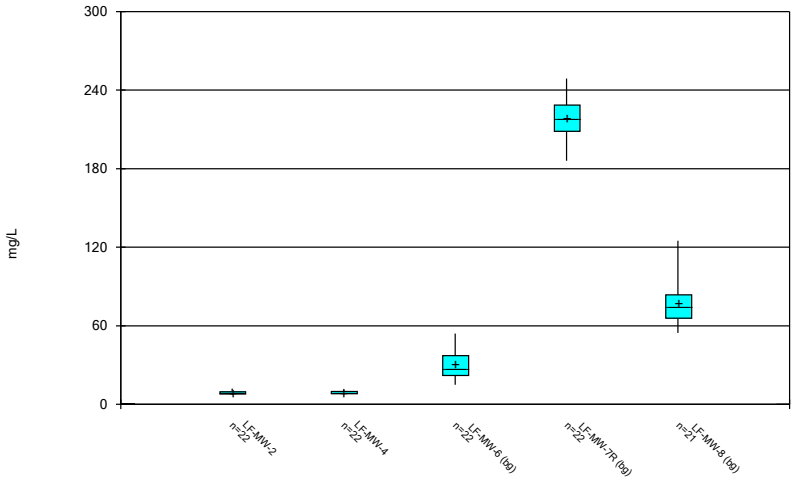
## Box & Whiskers Plot




Constituent: Sulfate Analysis Run 11/18/2024 8:42 AM

Amos Landfill Client: Geosyntec Data: Amos LF

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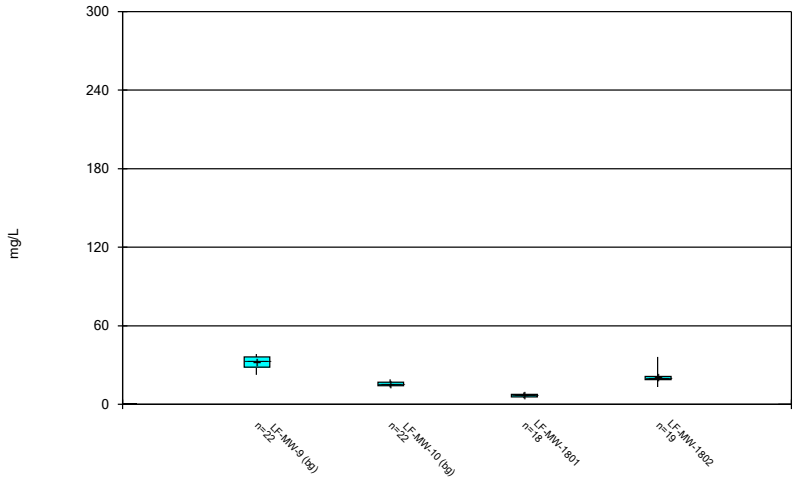
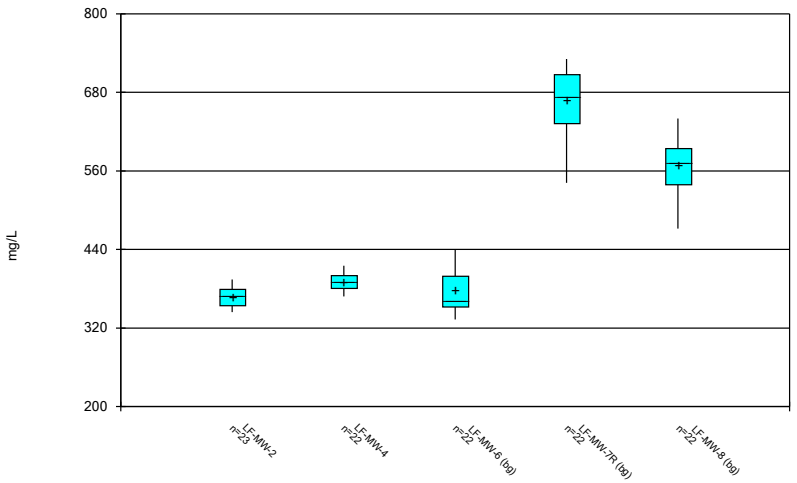
## Box & Whiskers Plot




Constituent: Sulfate Analysis Run 11/18/2024 8:42 AM

Amos Landfill Client: Geosyntec Data: Amos LF

## Box & Whiskers Plot




Constituent: Total Dissolved Solids Analysis Run 11/18/2024 8:42 AM

Amos Landfill Client: Geosyntec Data: Amos LF

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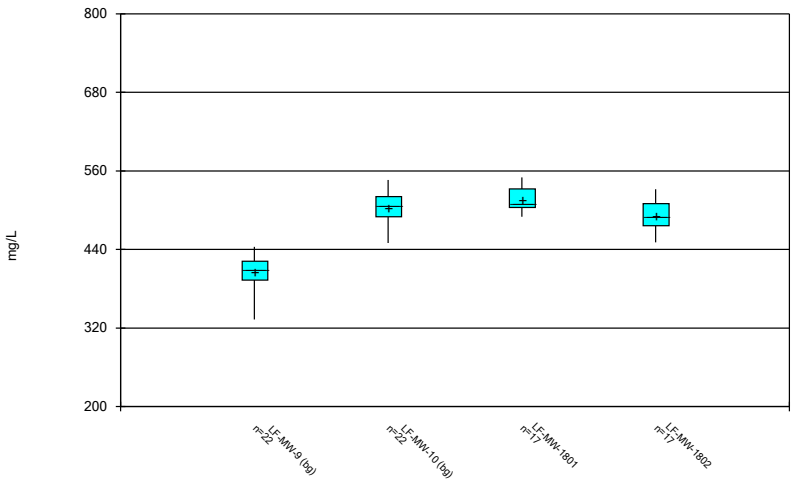
## Box & Whiskers Plot




Constituent: Total Dissolved Solids Analysis Run 11/18/2024 8:42 AM

Amos Landfill Client: Geosyntec Data: Amos LF

# FIGURE C
# Outlier Summary

# Outlier Summary

Amos Landfill Client: Geosyntec Data: Amos LF Printed 11/14/2024, 2:45 PM

| | LF-MW-2 Boron (mg/L) | LF-MW-2 Calcium (mg/L) | LF-MW-10 Chloride (mg/L) | LF-MW-1802 Chloride (mg/L) | LF-MW-2 Fluoride (mg/L) | LF-MW-10 Fluoride (mg/L) | LF-MW-1802 Fluoride (mg/L) | LF-MW-2 pH, field (SU) | LF-MW-4 pH, field (SU) | LF-MW-10 pH, field (SU) |
|---|---|---|---|---|---|---|---|---|---|---|
| 11/9/2016 | | | | | | | | | | |
| 1/8/2018 | | | | | | | | | 3.3 (o) | |
| 5/1/2018 | | 3.5 (o) | | | | | | | | |
| 6/19/2018 | 0.338 (o) | | | | | | | | | |
| 11/4/2021 | | | | 5.47 (o) | | | 0.73 (o) | | | |
| 11/5/2021 | | | 16.4 (o) | | | 4.88 (o) | | | | |
| 3/1/2022 | | | | | 0.09 (o) | | | 6.31 (o) | | |
| 5/24/2022 | | | | | | | | 6.11 (o) | | |
| 5/25/2022 | | | | | | | | | | 5.95 (o) |

| | LF-MW-1802 pH, field (SU) | LF-MW-8 Sulfate (mg/L) |
|---|---|---|
| 11/9/2016 | | 26.1 (o) |
| 1/8/2018 | | |
| 5/1/2018 | | |
| 6/19/2018 | | |
| 11/4/2021 | | |
| 11/5/2021 | | |
| 3/1/2022 | | |
| 5/24/2022 | | |
| 5/25/2022 | 6.05 (o) | |

# Tukey's Outlier Analysis - Significant Results

Amos Landfill Client: Geosyntec Data: Amos LF Printed 11/14/2024, 2:33 PM

| Constituent | Well | Outlier | Value(s) | Method | Alpha | N | Mean | Std. Dev. | Distribution | Normality Test |
|---|---|---|---|---|---|---|---|---|---|---|
| **Boron (mg/L)** | **LF-MW-2** | **Yes** | **0.338** | **NP** | **NaN** | **24** | **0.2104** | **0.03273** | **ln(x)** | **ShapiroWilk** |
| **Calcium (mg/L)** | **LF-MW-2** | **Yes** | **3.5** | **NP** | **NaN** | **24** | **1.902** | **0.4802** | **ln(x)** | **ShapiroWilk** |
| **Chloride (mg/L)** | **LF-MW-10 (bg)** | **Yes** | **16.4** | **NP** | **NaN** | **22** | **5.473** | **2.509** | **ln(x)** | **ShapiroWilk** |
| **Fluoride (mg/L)** | **LF-MW-10 (bg)** | **Yes** | **4.88** | **NP** | **NaN** | **22** | **0.7982** | **0.9231** | **ln(x)** | **ShapiroWilk** |
| **pH, field (SU)** | **LF-MW-2** | **Yes** | **6.31,6.11** | **NP** | **NaN** | **31** | **8.447** | **0.6189** | **x^6** | **ShapiroWilk** |
| **pH, field (SU)** | **LF-MW-4** | **Yes** | **3.3** | **NP** | **NaN** | **28** | **8.967** | **1.157** | **x^6** | **ShapiroWilk** |
| **pH, field (SU)** | **LF-MW-10 (bg)** | **Yes** | **5.95** | **NP** | **NaN** | **22** | **8.657** | **0.7262** | **x^6** | **ShapiroWilk** |
| **pH, field (SU)** | **LF-MW-1802** | **Yes** | **6.05** | **NP** | **NaN** | **24** | **8.924** | **0.6316** | **x^6** | **ShapiroWilk** |
| **Sulfate (mg/L)** | **LF-MW-1802** | **Yes** | **32.8,36.2** | **NP** | **NaN** | **19** | **21.35** | **5.717** | **ln(x)** | **ShapiroWilk** |

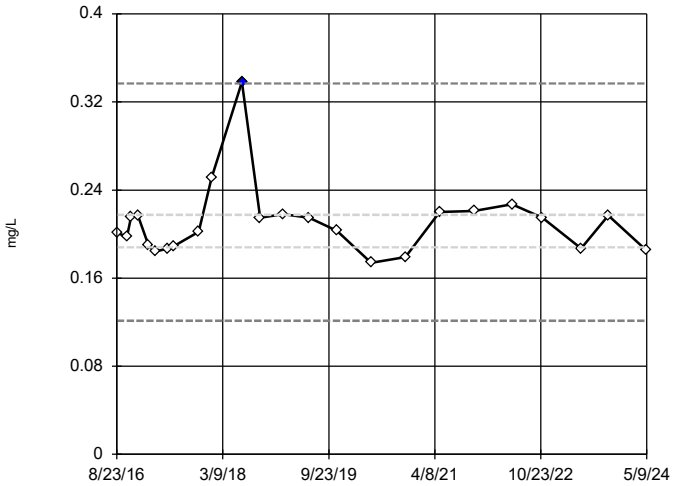
# Tukey's Outlier Analysis - All Results

Amos Landfill Client: Geosyntec Data: Amos LF Printed 11/14/2024, 2:33 PM

| Constituent | Well | Outlier | Value(s) | Method | Alpha | N | Mean | Std. Dev. | Distribution | Normality Test |
|---|---|---|---|---|---|---|---|---|---|---|
| **Boron (mg/L)** | **LF-MW-2** | **Yes** | **0.338** | **NP** | **NaN** | **24** | **0.2104** | **0.03273** | **ln(x)** | **ShapiroWilk** |
| Boron (mg/L) | LF-MW-4 | No | n/a | NP | NaN | 23 | 0.1709 | 0.01568 | ln(x) | ShapiroWilk |
| Boron (mg/L) | LF-MW-6 (bg) | No | n/a | NP | NaN | 22 | 0.1133 | 0.02956 | ln(x) | ShapiroWilk |
| Boron (mg/L) | LF-MW-7R (bg) | No | n/a | NP | NaN | 22 | 0.09218 | 0.01739 | ln(x) | ShapiroWilk |
| Boron (mg/L) | LF-MW-8 (bg) | No | n/a | NP | NaN | 22 | 0.1211 | 0.1838 | ln(x) | ShapiroWilk |
| Boron (mg/L) | LF-MW-9 (bg) | No | n/a | NP | NaN | 22 | 0.06686 | 0.03429 | ln(x) | ShapiroWilk |
| Boron (mg/L) | LF-MW-10 (bg) | No | n/a | NP | NaN | 22 | 0.09895 | 0.04631 | ln(x) | ShapiroWilk |
| Boron (mg/L) | LF-MW-1801 | No | n/a | NP | NaN | 17 | 0.2448 | 0.01644 | x^5 | ShapiroWilk |
| Boron (mg/L) | LF-MW-1802 | No | n/a | NP | NaN | 17 | 0.2363 | 0.04263 | x^6 | ShapiroWilk |
| **Calcium (mg/L)** | **LF-MW-2** | **Yes** | **3.5** | **NP** | **NaN** | **24** | **1.902** | **0.4802** | **ln(x)** | **ShapiroWilk** |
| Calcium (mg/L) | LF-MW-4 | No | n/a | NP | NaN | 23 | 0.8143 | 0.0642 | x^(1/3) | ShapiroWilk |
| Calcium (mg/L) | LF-MW-6 (bg) | No | n/a | NP | NaN | 22 | 38.65 | 3.657 | ln(x) | ShapiroWilk |
| Calcium (mg/L) | LF-MW-7R (bg) | No | n/a | NP | NaN | 22 | 34.77 | 5.158 | ln(x) | ShapiroWilk |
| Calcium (mg/L) | LF-MW-8 (bg) | No | n/a | NP | NaN | 22 | 124.1 | 15.52 | x^3 | ShapiroWilk |
| Calcium (mg/L) | LF-MW-9 (bg) | No | n/a | NP | NaN | 22 | 82.84 | 13.51 | x^2 | ShapiroWilk |
| Calcium (mg/L) | LF-MW-10 (bg) | No | n/a | NP | NaN | 22 | 1.3 | 0.3765 | ln(x) | ShapiroWilk |
| Calcium (mg/L) | LF-MW-1801 | No | n/a | NP | NaN | 17 | 1.569 | 0.1256 | ln(x) | ShapiroWilk |
| Calcium (mg/L) | LF-MW-1802 | No | n/a | NP | NaN | 22 | 0.9766 | 0.1255 | ln(x) | ShapiroWilk |
| Chloride (mg/L) | LF-MW-2 | No | n/a | NP | NaN | 22 | 3.681 | 0.7136 | x^(1/3) | ShapiroWilk |
| Chloride (mg/L) | LF-MW-4 | No | n/a | NP | NaN | 26 | 18.34 | 4.552 | ln(x) | ShapiroWilk |
| Chloride (mg/L) | LF-MW-6 (bg) | No | n/a | NP | NaN | 22 | 7.674 | 0.7389 | ln(x) | ShapiroWilk |
| Chloride (mg/L) | LF-MW-7R (bg) | No | n/a | NP | NaN | 22 | 3.789 | 0.1883 | ln(x) | ShapiroWilk |
| Chloride (mg/L) | LF-MW-8 (bg) | No | n/a | NP | NaN | 22 | 28.52 | 27.6 | ln(x) | ShapiroWilk |
| Chloride (mg/L) | LF-MW-9 (bg) | No | n/a | NP | NaN | 22 | 5.238 | 1.266 | x^6 | ShapiroWilk |
| **Chloride (mg/L)** | **LF-MW-10 (bg)** | **Yes** | **16.4** | **NP** | **NaN** | **22** | **5.473** | **2.509** | **ln(x)** | **ShapiroWilk** |
| Chloride (mg/L) | LF-MW-1801 | No | n/a | NP | NaN | 25 | 13.04 | 1.874 | sqrt(x) | ShapiroWilk |
| Chloride (mg/L) | LF-MW-1802 | No | n/a | NP | NaN | 22 | 11.72 | 3.488 | ln(x) | ShapiroWilk |
| Fluoride (mg/L) | LF-MW-2 | No | n/a | NP | NaN | 28 | 1.354 | 0.3052 | x^3 | ShapiroWilk |
| Fluoride (mg/L) | LF-MW-4 | No | n/a | NP | NaN | 24 | 1.406 | 0.06619 | ln(x) | ShapiroWilk |
| Fluoride (mg/L) | LF-MW-6 (bg) | No | n/a | NP | NaN | 22 | 0.2391 | 0.02136 | ln(x) | ShapiroWilk |
| Fluoride (mg/L) | LF-MW-7R (bg) | No | n/a | NP | NaN | 22 | 0.3073 | 0.04061 | x^2 | ShapiroWilk |
| Fluoride (mg/L) | LF-MW-8 (bg) | No | n/a | NP | NaN | 22 | 0.1577 | 0.02793 | x^2 | ShapiroWilk |
| Fluoride (mg/L) | LF-MW-9 (bg) | No | n/a | NP | NaN | 22 | 0.2132 | 0.03564 | ln(x) | ShapiroWilk |
| **Fluoride (mg/L)** | **LF-MW-10 (bg)** | **Yes** | **4.88** | **NP** | **NaN** | **22** | **0.7982** | **0.9231** | **ln(x)** | **ShapiroWilk** |
| Fluoride (mg/L) | LF-MW-1801 | No | n/a | NP | NaN | 17 | 5.236 | 0.1404 | x^6 | ShapiroWilk |
| Fluoride (mg/L) | LF-MW-1802 | No | n/a | NP | NaN | 18 | 4.681 | 1.002 | x^6 | ShapiroWilk |
| **pH, field (SU)** | **LF-MW-2** | **Yes** | **6.31,6.11** | **NP** | **NaN** | **31** | **8.447** | **0.6189** | **x^6** | **ShapiroWilk** |
| **pH, field (SU)** | **LF-MW-4** | **Yes** | **3.3** | **NP** | **NaN** | **28** | **8.967** | **1.157** | **x^6** | **ShapiroWilk** |
| pH, field (SU) | LF-MW-6 (bg) | No | n/a | NP | NaN | 22 | 7.54 | 0.1712 | ln(x) | ShapiroWilk |
| pH, field (SU) | LF-MW-7R (bg) | No | n/a | NP | NaN | 22 | 7.531 | 0.187 | x^6 | ShapiroWilk |
| pH, field (SU) | LF-MW-8 (bg) | No | n/a | NP | NaN | 22 | 7.007 | 0.2156 | ln(x) | ShapiroWilk |
| pH, field (SU) | LF-MW-9 (bg) | No | n/a | NP | NaN | 22 | 7.188 | 0.1668 | ln(x) | ShapiroWilk |
| **pH, field (SU)** | **LF-MW-10 (bg)** | **Yes** | **5.95** | **NP** | **NaN** | **22** | **8.657** | **0.7262** | **x^6** | **ShapiroWilk** |
| pH, field (SU) | LF-MW-1801 | No | n/a | NP | NaN | 25 | 8.845 | 0.2008 | ln(x) | ShapiroWilk |
| **pH, field (SU)** | **LF-MW-1802** | **Yes** | **6.05** | **NP** | **NaN** | **24** | **8.924** | **0.6316** | **x^6** | **ShapiroWilk** |
| Sulfate (mg/L) | LF-MW-2 | No | n/a | NP | NaN | 22 | 8.844 | 1.381 | ln(x) | ShapiroWilk |
| Sulfate (mg/L) | LF-MW-4 | No | n/a | NP | NaN | 22 | 9.111 | 1.119 | ln(x) | ShapiroWilk |
| Sulfate (mg/L) | LF-MW-6 (bg) | No | n/a | NP | NaN | 22 | 30.75 | 11.92 | ln(x) | ShapiroWilk |
| Sulfate (mg/L) | LF-MW-7R (bg) | No | n/a | NP | NaN | 22 | 219.2 | 16.7 | ln(x) | ShapiroWilk |
| Sulfate (mg/L) | LF-MW-8 (bg) | No | n/a | NP | NaN | 22 | 75.17 | 19.52 | normal | ShapiroWilk |
| Sulfate (mg/L) | LF-MW-9 (bg) | No | n/a | NP | NaN | 22 | 32.58 | 4.256 | x^3 | ShapiroWilk |
| Sulfate (mg/L) | LF-MW-10 (bg) | No | n/a | NP | NaN | 22 | 15.47 | 1.661 | ln(x) | ShapiroWilk |
| Sulfate (mg/L) | LF-MW-1801 | No | n/a | NP | NaN | 18 | 6.696 | 1.232 | normal | ShapiroWilk |
| **Sulfate (mg/L)** | **LF-MW-1802** | **Yes** | **32.8,36.2** | **NP** | **NaN** | **19** | **21.35** | **5.717** | **ln(x)** | **ShapiroWilk** |
| Total Dissolved Solids (mg/L) | LF-MW-2 | No | n/a | NP | NaN | 23 | 367.7 | 13.56 | x^2 | ShapiroWilk |
| Total Dissolved Solids (mg/L) | LF-MW-4 | No | n/a | NP | NaN | 22 | 390.7 | 13.47 | ln(x) | ShapiroWilk |
| Total Dissolved Solids (mg/L) | LF-MW-6 (bg) | No | n/a | NP | NaN | 22 | 376.9 | 30.85 | ln(x) | ShapiroWilk |
| Total Dissolved Solids (mg/L) | LF-MW-7R (bg) | No | n/a | NP | NaN | 22 | 667.1 | 46.4 | x^5 | ShapiroWilk |
| Total Dissolved Solids (mg/L) | LF-MW-8 (bg) | No | n/a | NP | NaN | 22 | 568 | 41.44 | x^2 | ShapiroWilk |
| Total Dissolved Solids (mg/L) | LF-MW-9 (bg) | No | n/a | NP | NaN | 22 | 406 | 26.25 | x^5 | ShapiroWilk |
| Total Dissolved Solids (mg/L) | LF-MW-10 (bg) | No | n/a | NP | NaN | 22 | 503.4 | 22.3 | x^6 | ShapiroWilk |
| Total Dissolved Solids (mg/L) | LF-MW-1801 | No | n/a | NP | NaN | 17 | 515.9 | 17.37 | ln(x) | ShapiroWilk |
| Total Dissolved Solids (mg/L) | LF-MW-1802 | No | n/a | NP | NaN | 17 | 491.4 | 21.74 | normal | ShapiroWilk |

## Tukey's Outlier Screening

LF-MW-2




n = 24

Outlier is drawn as solid. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.3368, low cutoff = 0.1214, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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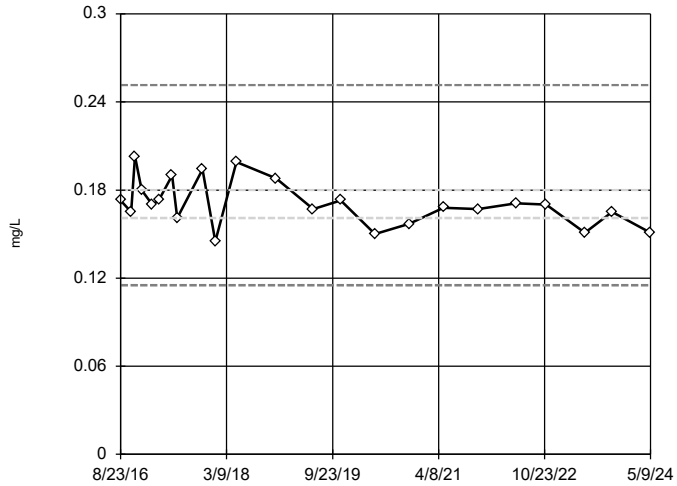
## Tukey's Outlier Screening

LF-MW-4




n = 23

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.2515, low cutoff = 0.1152, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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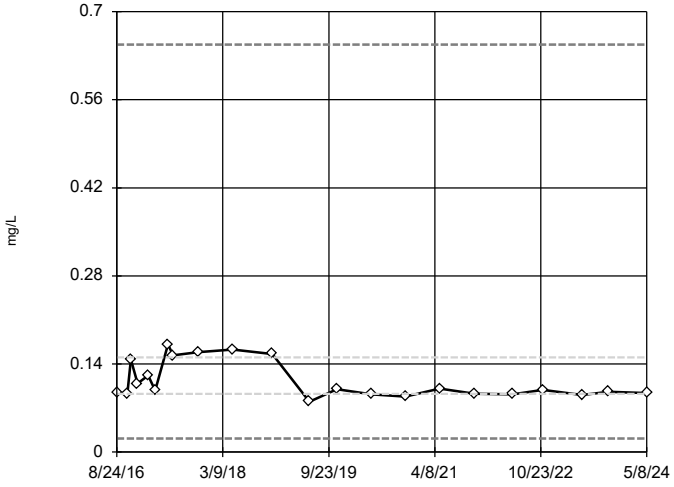
## Tukey's Outlier Screening

LF-MW-6 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.6475, low cutoff = 0.02149, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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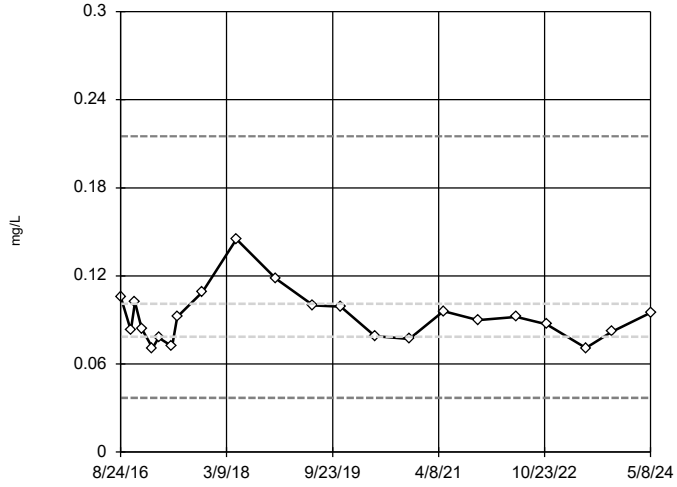
## Tukey's Outlier Screening

LF-MW-7R (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

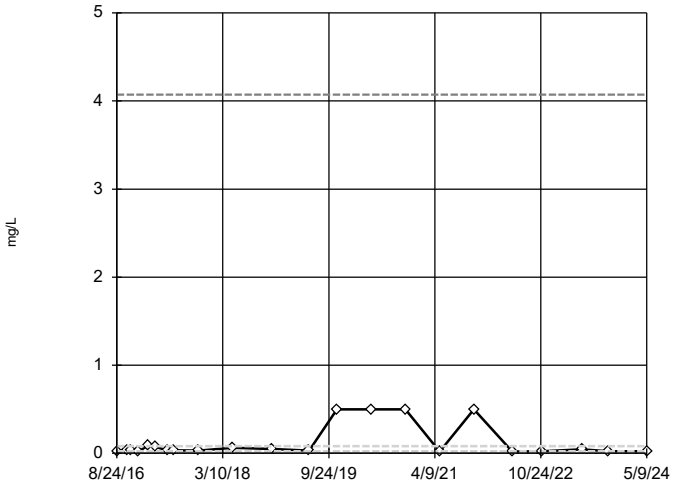
High cutoff = 0.2151, low cutoff = 0.03686, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

## Tukey's Outlier Screening

LF-MW-8 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 4.072, low cutoff = 0.0004558, based on IQR multiplier of 3.

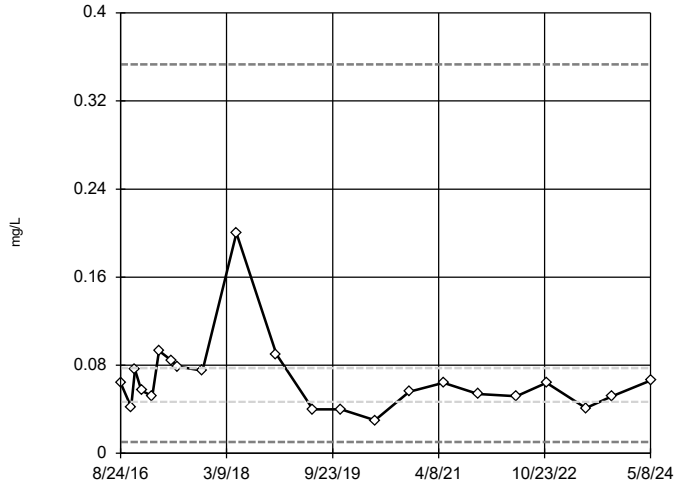
Constituent: Boron Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF



## Tukey's Outlier Screening

LF-MW-9 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.3532, low cutoff = 0.01025, based on IQR multiplier of 3.

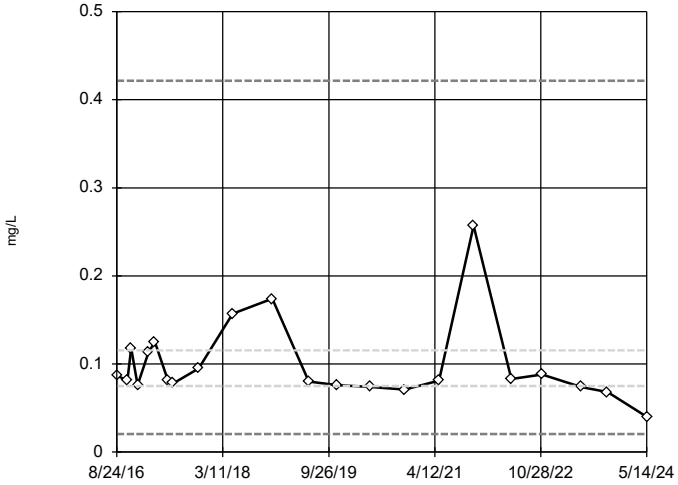
Constituent: Boron Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF



## Tukey's Outlier Screening

LF-MW-10 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.4216, low cutoff = 0.02054, based on IQR multiplier of 3.

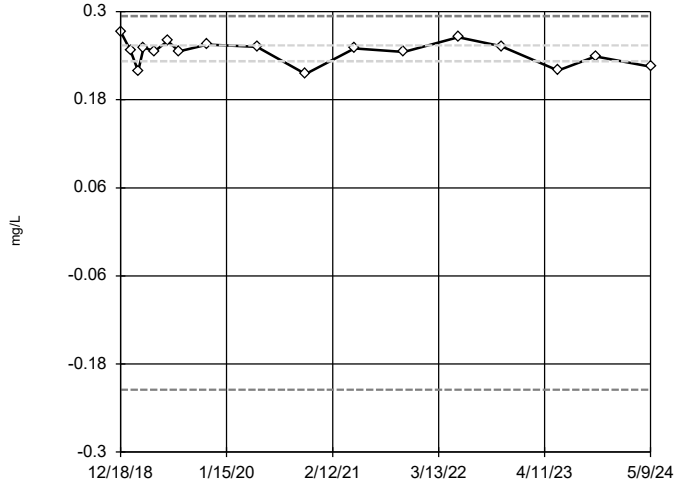
Constituent: Boron Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF



## Tukey's Outlier Screening

LF-MW-1801




n = 17

No outliers found. Tukey's method selected by user.

Data were x^5 transformed to achieve best W statistic (graph shown in original units).

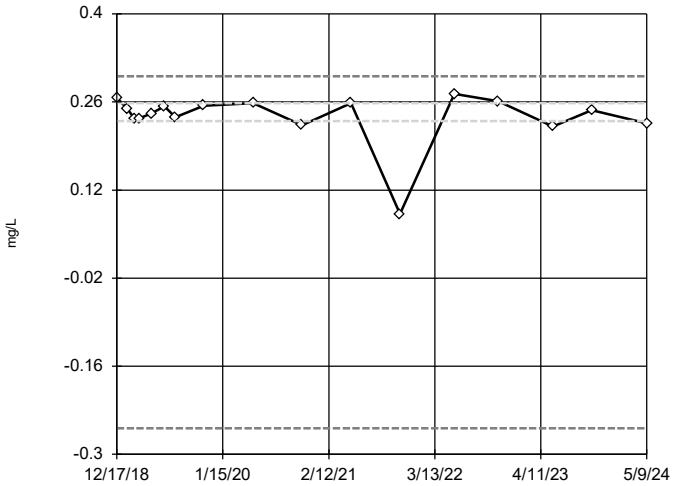
High cutoff = 0.294, low cutoff = -0.215, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

## Tukey's Outlier Screening

LF-MW-1802




n = 17

No outliers found. Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.3007, low cutoff = -0.2585, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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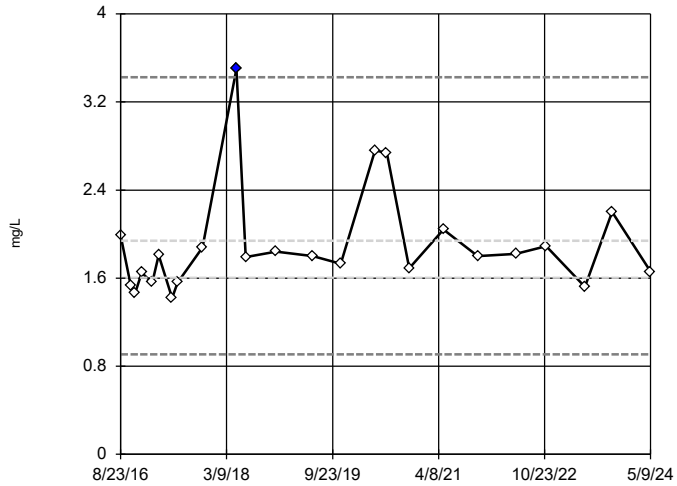
## Tukey's Outlier Screening

LF-MW-2




n = 24

Outlier is drawn as solid. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 3.425, low cutoff = 0.9083, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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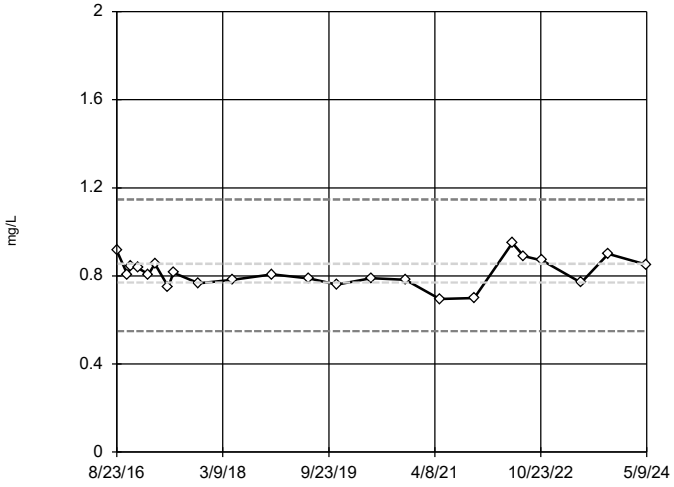
## Tukey's Outlier Screening

LF-MW-4




n = 23

No outliers found. Tukey's method selected by user.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1.147, low cutoff = 0.5491, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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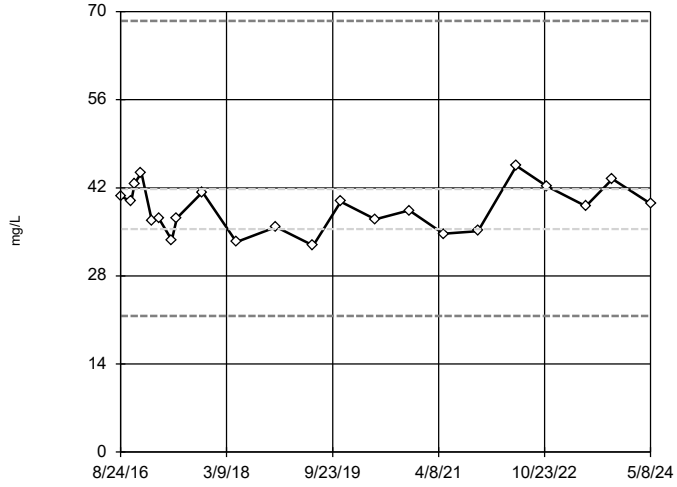
## Tukey's Outlier Screening

LF-MW-6 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

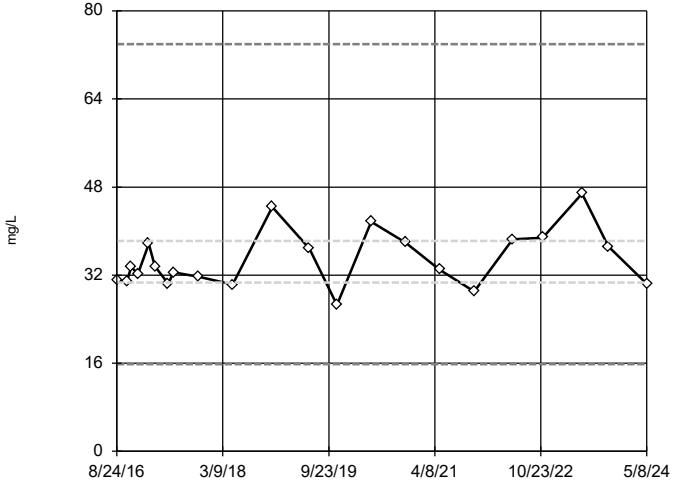
High cutoff = 68.52, low cutoff = 21.62, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

## Tukey's Outlier Screening

LF-MW-7R (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 73.95, low cutoff = 15.83, based on IQR multiplier of 3.

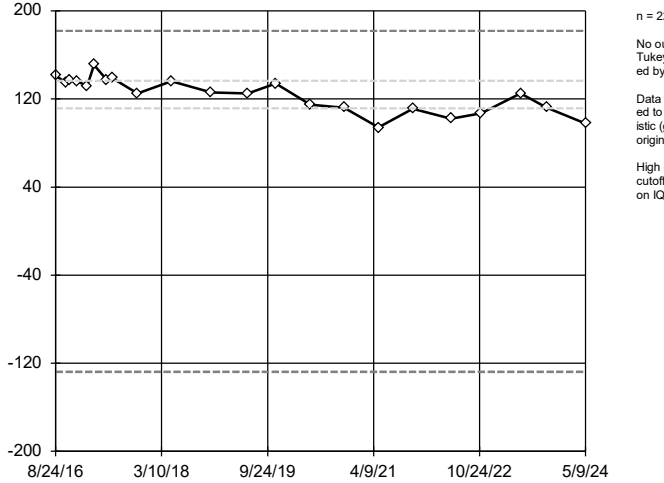
Constituent: Calcium Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF



## Tukey's Outlier Screening

LF-MW-8 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units).

High cutoff = 181.9, low cutoff = -127.8, based on IQR multiplier of 3.

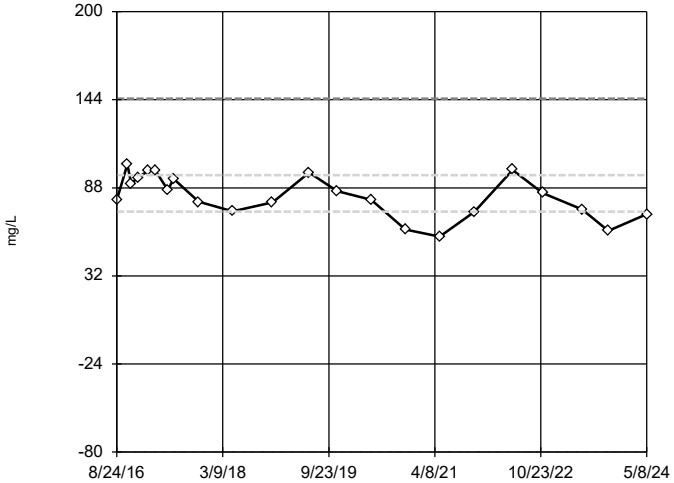
Constituent: Calcium Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF



## Tukey's Outlier Screening

LF-MW-9 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 144.7, low cutoff = -79.99, based on IQR multiplier of 3.

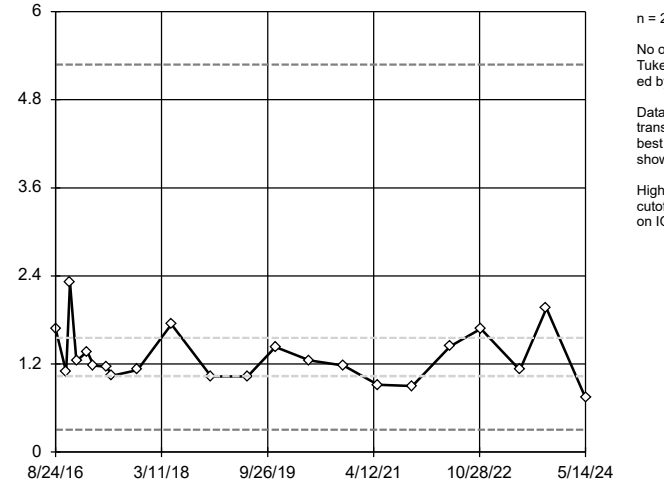
Constituent: Calcium Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF



## Tukey's Outlier Screening

LF-MW-10 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

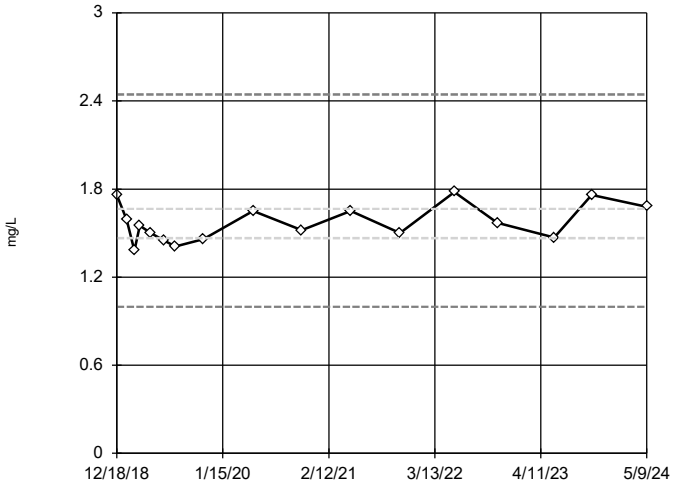
High cutoff = 5.279, low cutoff = 0.305, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

## Tukey's Outlier Screening

LF-MW-1801




n = 17

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 2.444, low cutoff = 0.998, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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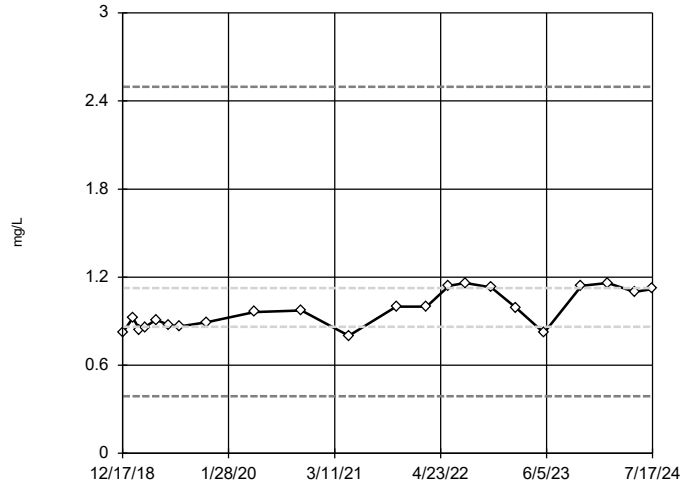
## Tukey's Outlier Screening

LF-MW-1802




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 2.496, low cutoff = 0.3887, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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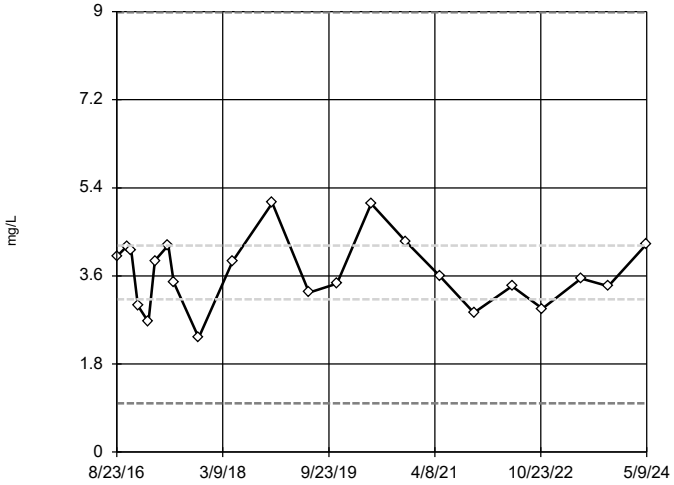
## Tukey's Outlier Screening

LF-MW-2




n = 22

No outliers found. Tukey's method selected by user.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 8.984, low cutoff = 0.9966, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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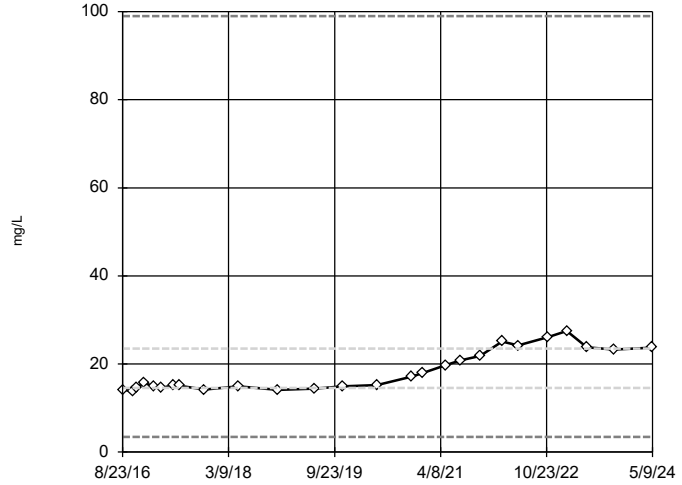
## Tukey's Outlier Screening

LF-MW-4




n = 26

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

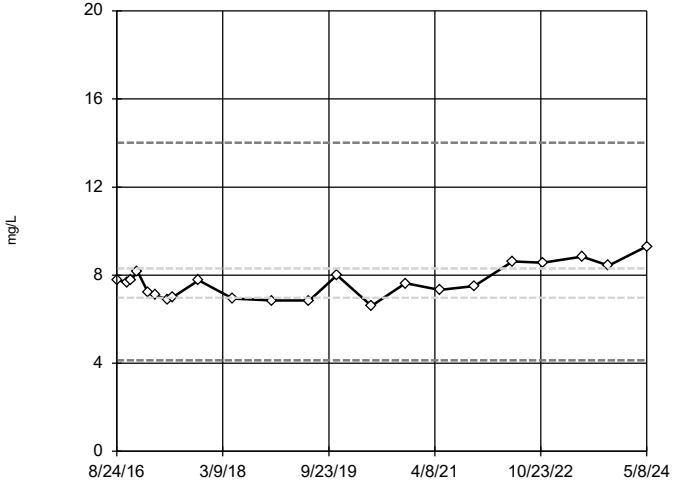
High cutoff = 99, low cutoff = 3.454, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

## Tukey's Outlier Screening

LF-MW-6 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 14.01, low cutoff = 4.133, based on IQR multiplier of 3.

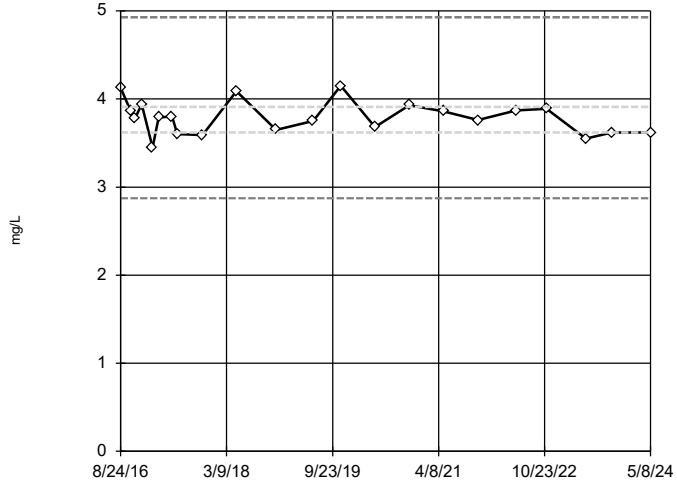
Constituent: Chloride Analysis Run 11/14/2024 2:31 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF



## Tukey's Outlier Screening

LF-MW-7R (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 4.927, low cutoff = 2.873, based on IQR multiplier of 3.

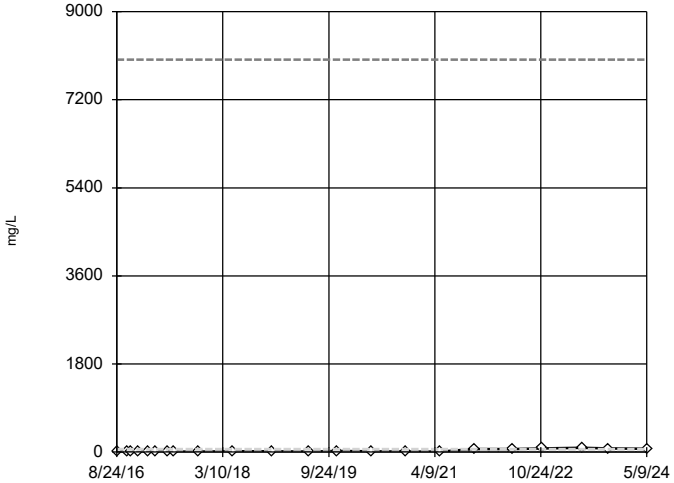
Constituent: Chloride Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF



## Tukey's Outlier Screening

LF-MW-8 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 8019, low cutoff = 0.09597, based on IQR multiplier of 3.

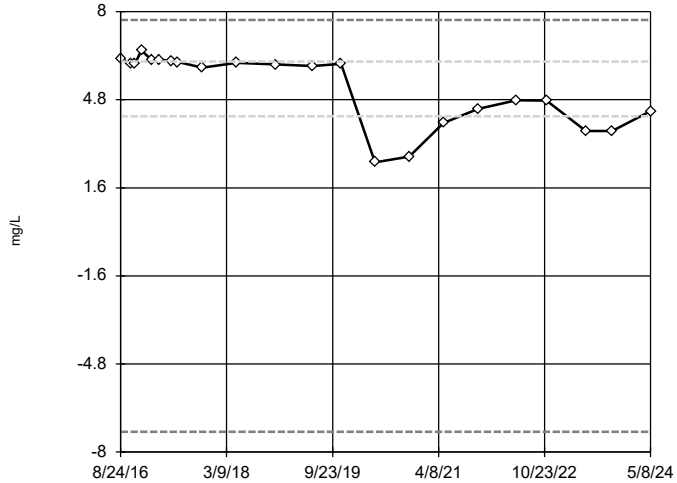
Constituent: Chloride Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF



## Tukey's Outlier Screening

LF-MW-9 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

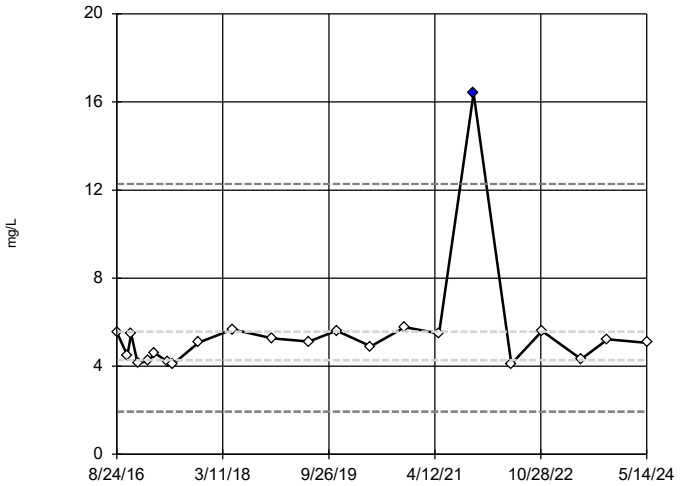
High cutoff = 7.702, low cutoff = -7.264, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

## Tukey's Outlier Screening

LF-MW-10 (bg)




n = 22

Outlier is drawn as solid. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 12.28, low cutoff = 1.942, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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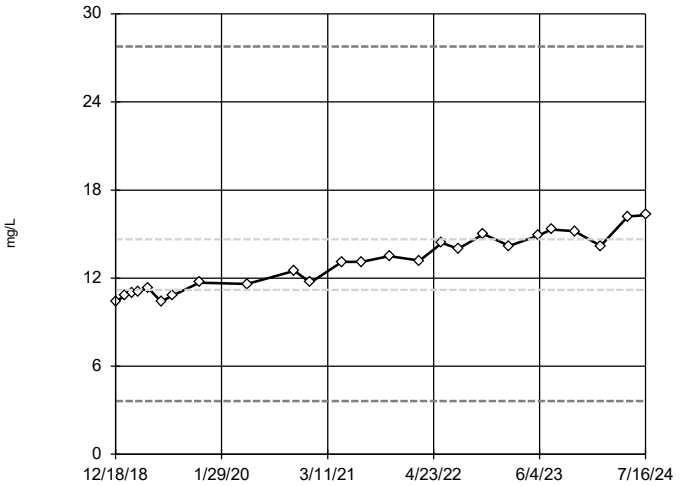
## Tukey's Outlier Screening

LF-MW-1801




n = 25

No outliers found. Tukey's method selected by user.

Data were square root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 27.77, low cutoff = 3.626, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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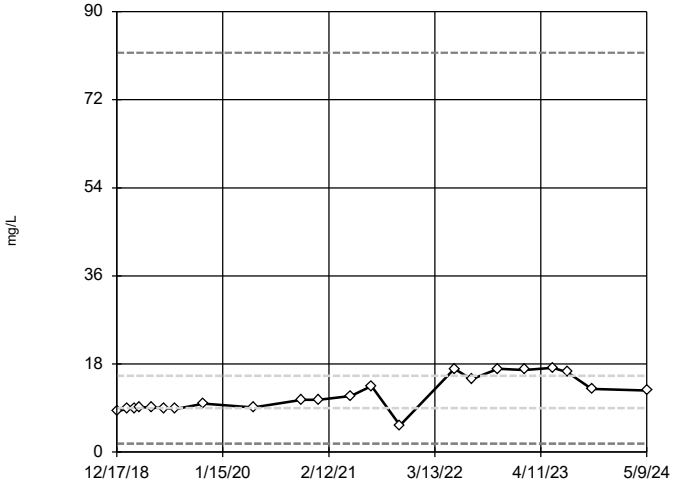
## Tukey's Outlier Screening

LF-MW-1802




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 81.59, low cutoff = 1.714, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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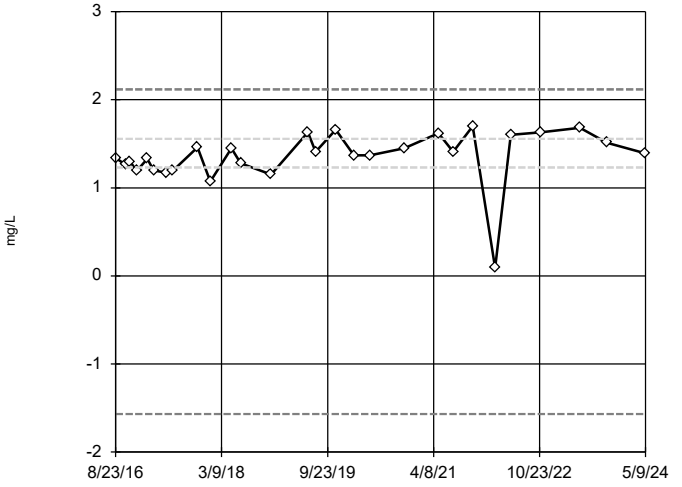
## Tukey's Outlier Screening

LF-MW-2




n = 28

No outliers found. Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units).

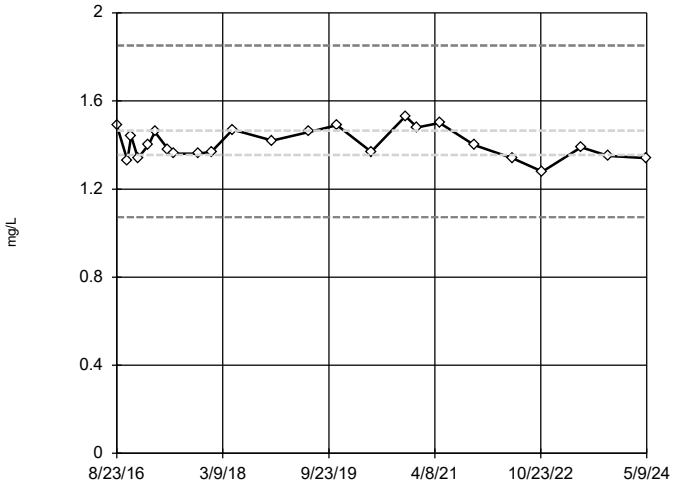
High cutoff = 2.117, low cutoff = -1.568, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

## Tukey's Outlier Screening

LF-MW-4




n = 24

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1.852, low cutoff = 1.072, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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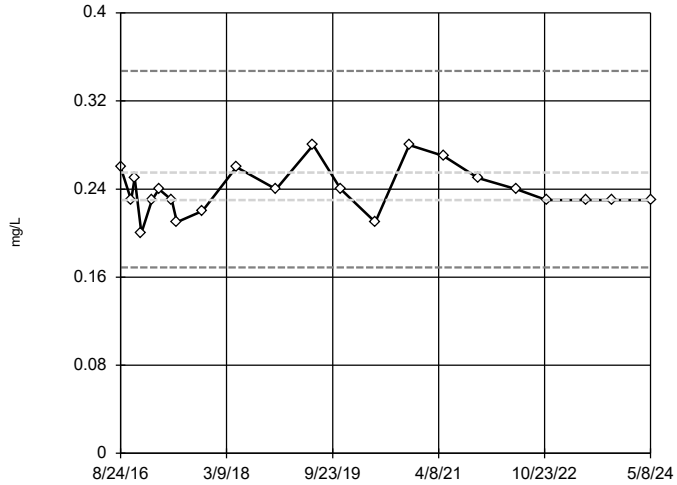
## Tukey's Outlier Screening

LF-MW-6 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.3473, low cutoff = 0.1689, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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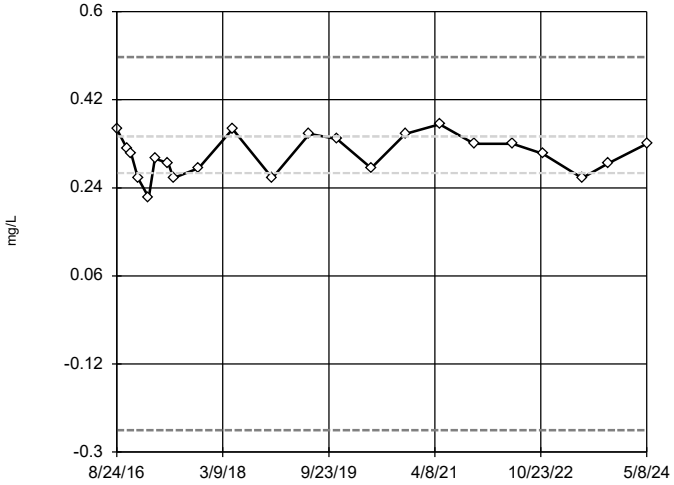
## Tukey's Outlier Screening

LF-MW-7R (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.5071, low cutoff = -0.2552, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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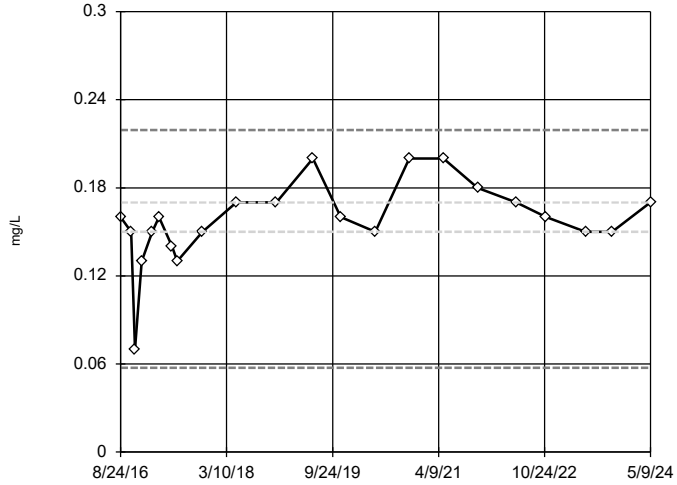
## Tukey's Outlier Screening

LF-MW-8 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units).

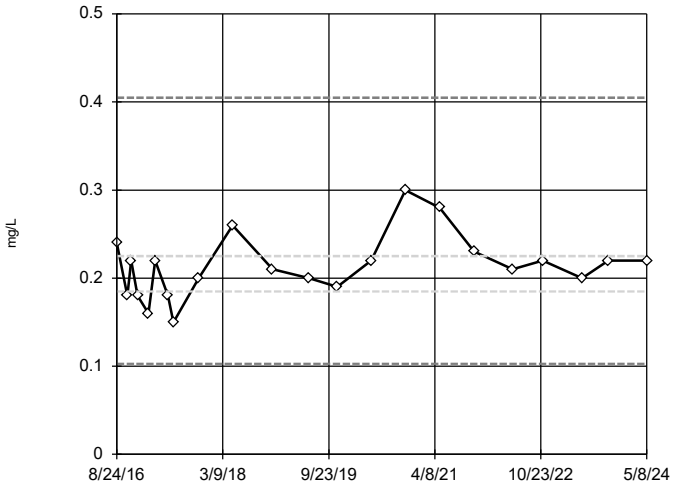
High cutoff = 0.2193, low cutoff = 0.05745, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

## Tukey's Outlier Screening

LF-MW-9 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.4048, low cutoff = 0.1028, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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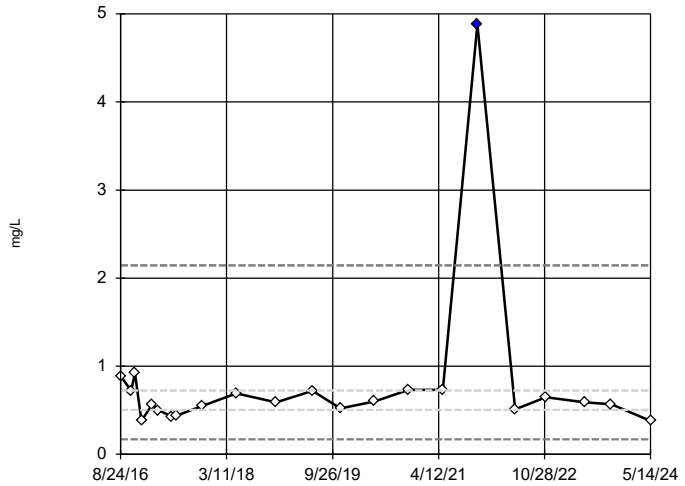
## Tukey's Outlier Screening

LF-MW-10 (bg)




n = 22

Outlier is drawn as solid. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 2.145, low cutoff = 0.1706, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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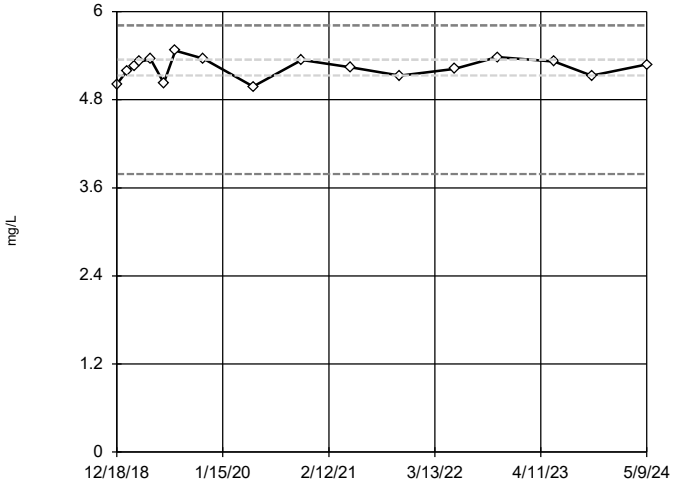
## Tukey's Outlier Screening

LF-MW-1801




n = 17

No outliers found. Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 5.813, low cutoff = 3.788, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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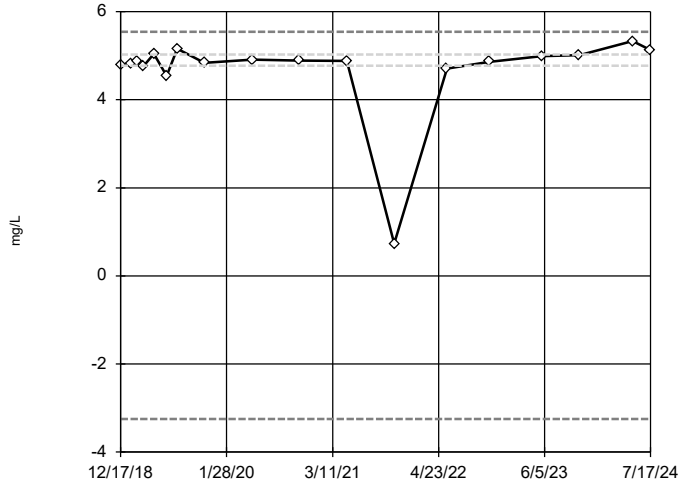
## Tukey's Outlier Screening

LF-MW-1802




n = 18

No outliers found. Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

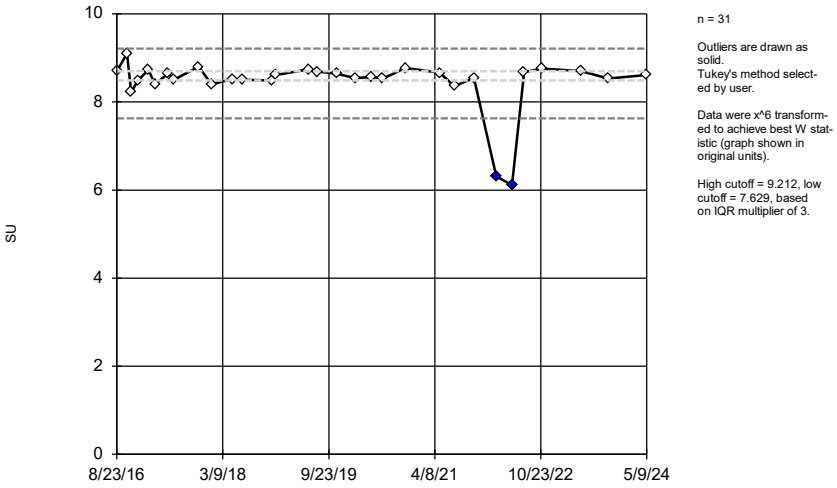
High cutoff = 5.545, low cutoff = -3.249, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

## Tukey's Outlier Screening

LF-MW-2




n = 31

Outliers are drawn as solid.
Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 9.212, low cutoff = 7.629, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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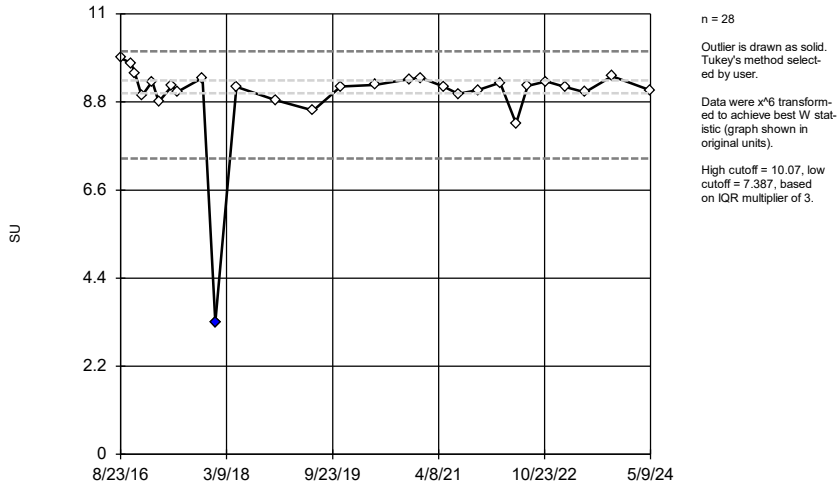
## Tukey's Outlier Screening

LF-MW-4




n = 28

Outlier is drawn as solid.
Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 10.07, low cutoff = 7.387, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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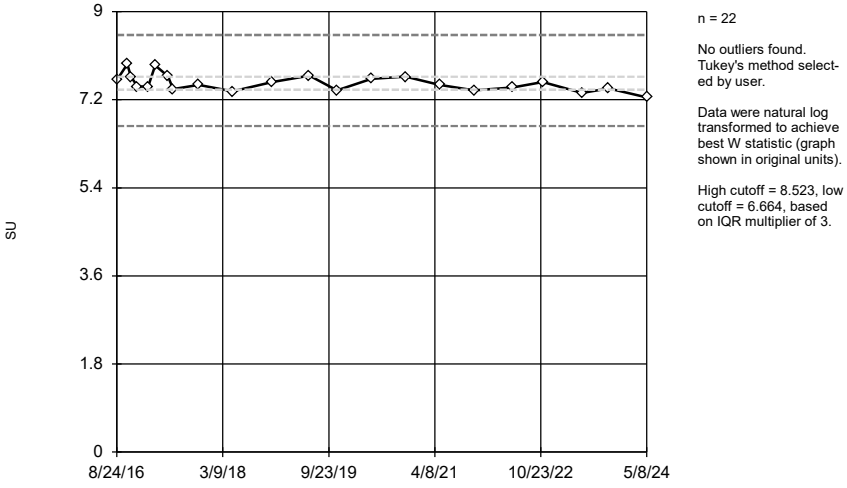
## Tukey's Outlier Screening

LF-MW-6 (bg)




n = 22

No outliers found.
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 8.523, low cutoff = 6.664, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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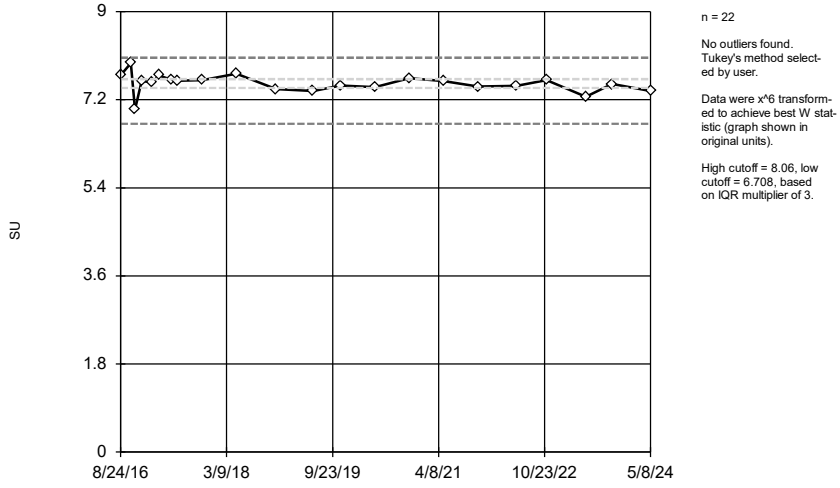
## Tukey's Outlier Screening

LF-MW-7R (bg)




n = 22

No outliers found.
Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

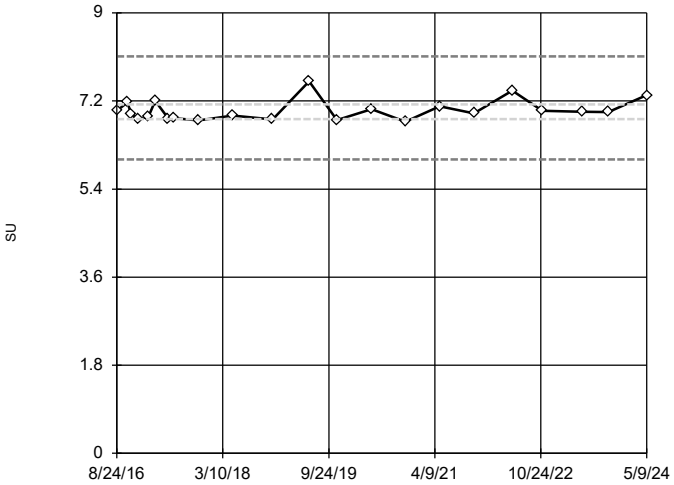
High cutoff = 8.06, low cutoff = 6.708, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

## Tukey's Outlier Screening

LF-MW-8 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 8.111, low cutoff = 6.004, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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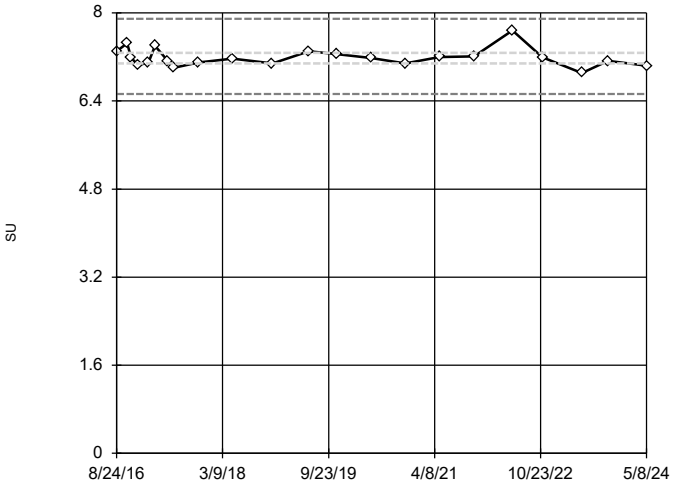
## Tukey's Outlier Screening

LF-MW-9 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 7.893, low cutoff = 6.526, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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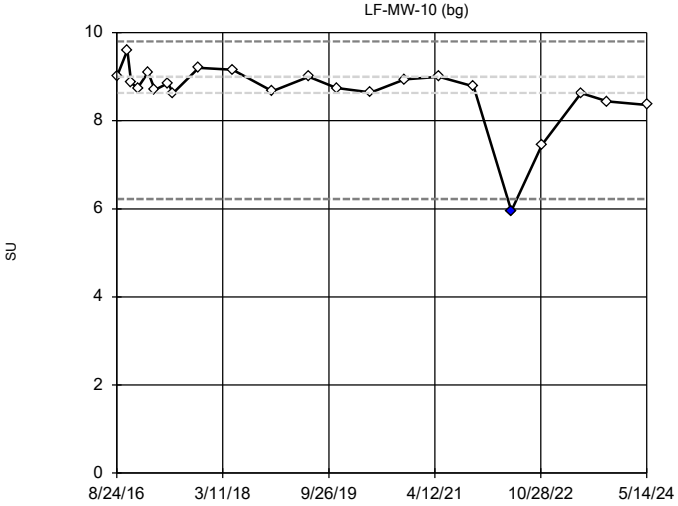
## Tukey's Outlier Screening

LF-MW-10 (bg)




n = 22

Outlier is drawn as solid. Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 9.801, low cutoff = 6.224, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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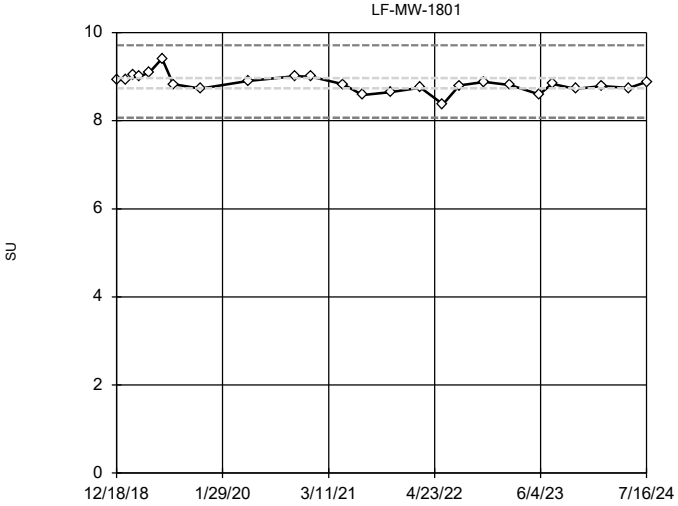
## Tukey's Outlier Screening

LF-MW-1801




n = 25

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

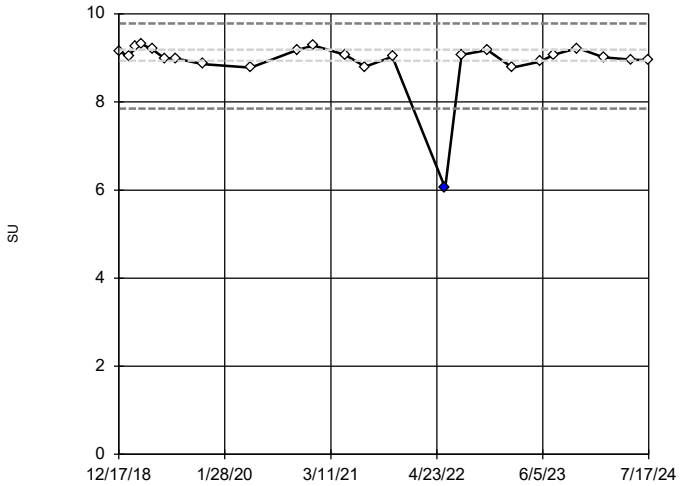
High cutoff = 9.713, low cutoff = 8.066, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

## Tukey's Outlier Screening

LF-MW-1802




n = 24

Outlier is drawn as solid. Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 9.78, low cutoff = 7.85, based on IQR multiplier of 3.

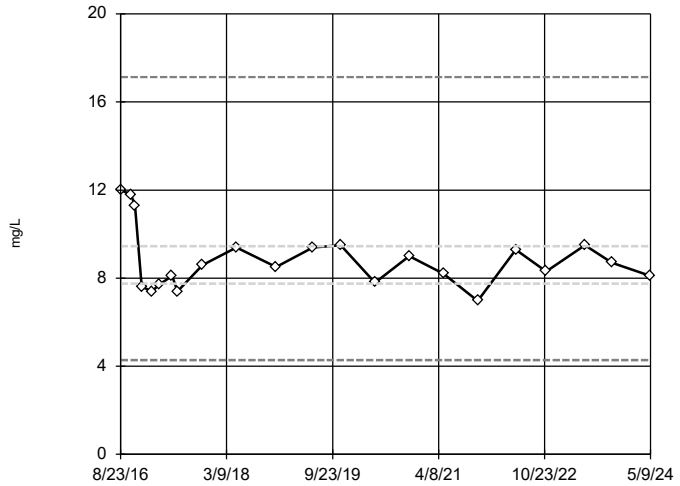
Constituent: pH, field Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF



## Tukey's Outlier Screening

LF-MW-2




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 17.13, low cutoff = 4.275, based on IQR multiplier of 3.

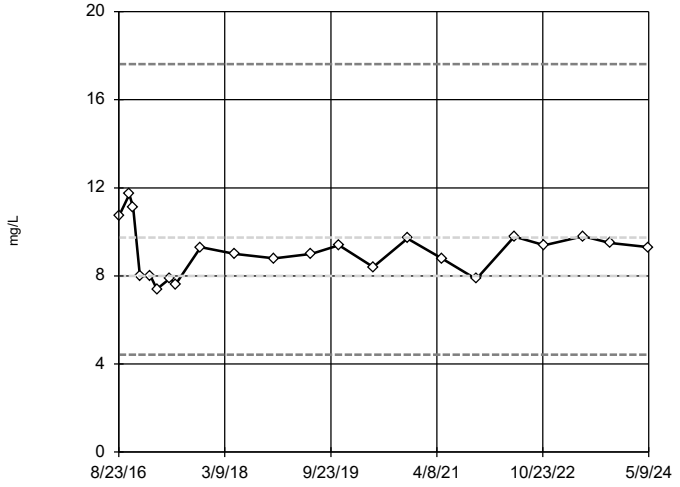
Constituent: Sulfate Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF



## Tukey's Outlier Screening

LF-MW-4




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 17.61, low cutoff = 4.426, based on IQR multiplier of 3.

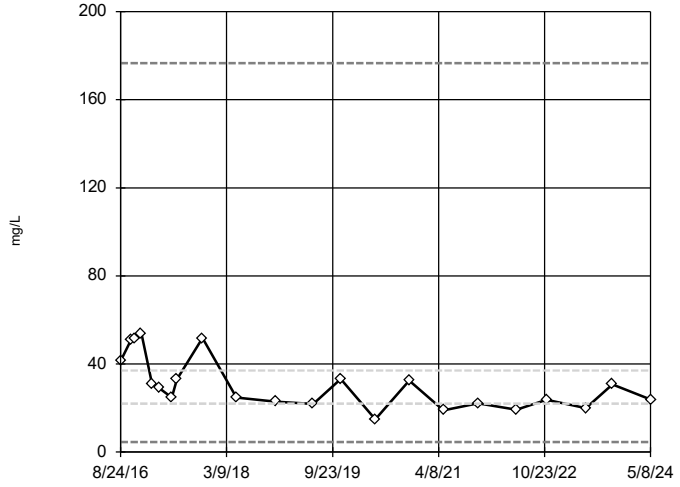
Constituent: Sulfate Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF



## Tukey's Outlier Screening

LF-MW-6 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

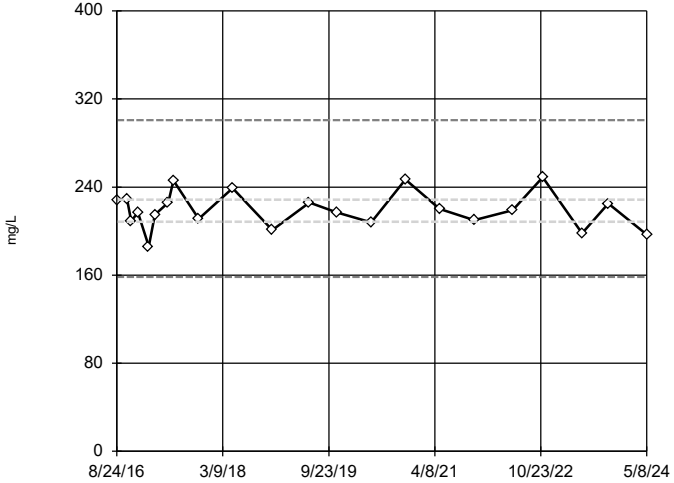
High cutoff = 176.6, low cutoff = 4.614, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

## Tukey's Outlier Screening

LF-MW-7R (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 300.8, low cutoff = 158.4, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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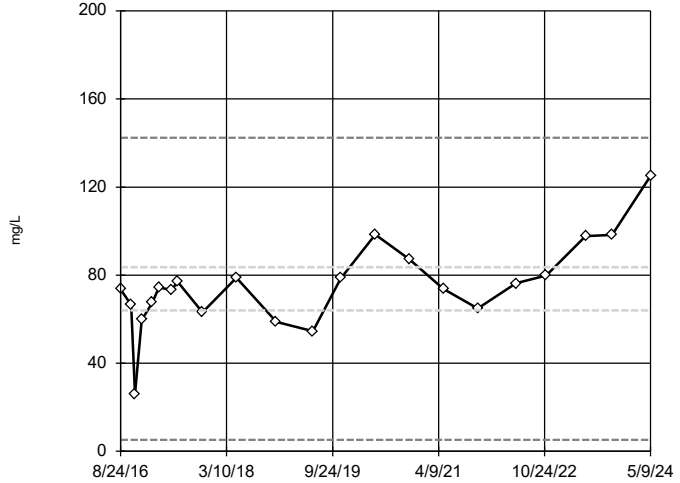
## Tukey's Outlier Screening

LF-MW-8 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 142.4, low cutoff = 5.2, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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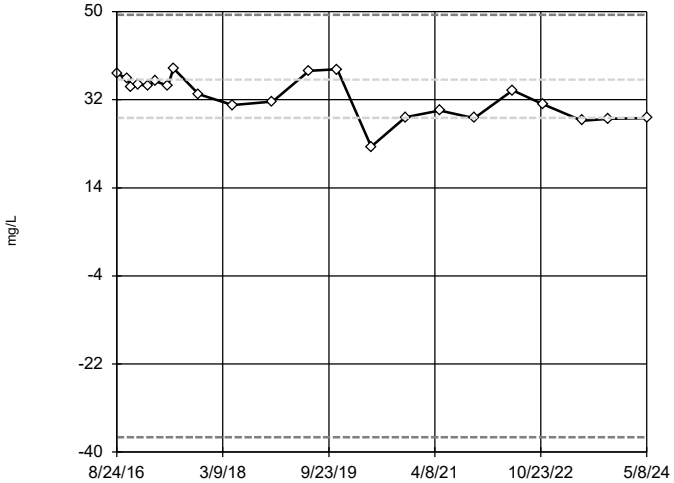
## Tukey's Outlier Screening

LF-MW-9 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units).

High cutoff = 49.35, low cutoff = -36.96, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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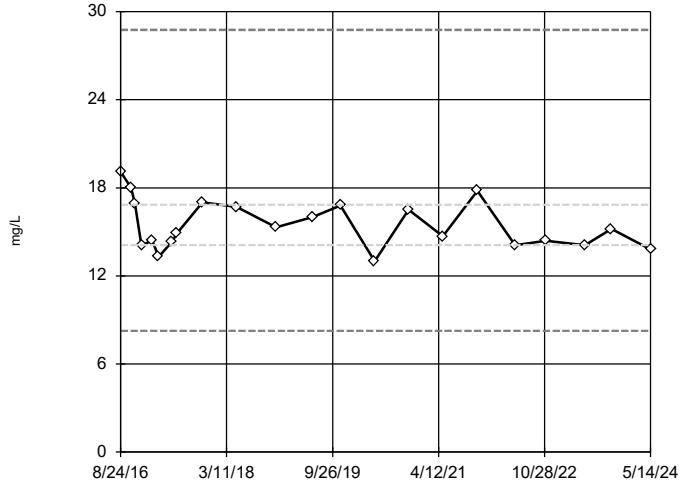
## Tukey's Outlier Screening

LF-MW-10 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

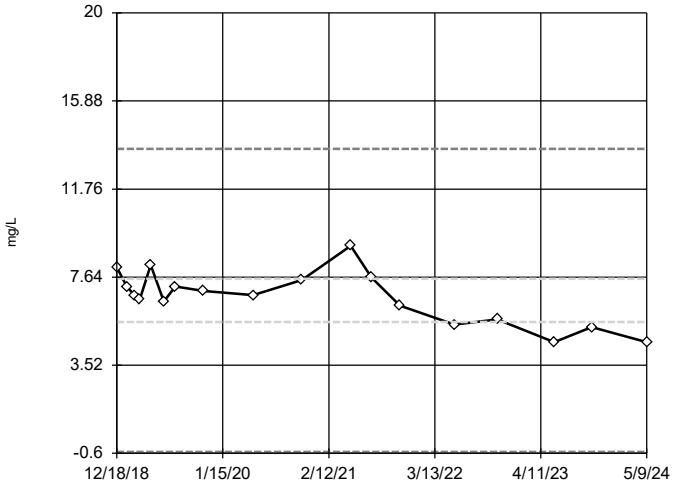
High cutoff = 28.76, low cutoff = 8.262, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

## Tukey's Outlier Screening

LF-MW-1801




n = 18

No outliers found. Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 13.64, low cutoff = -0.535, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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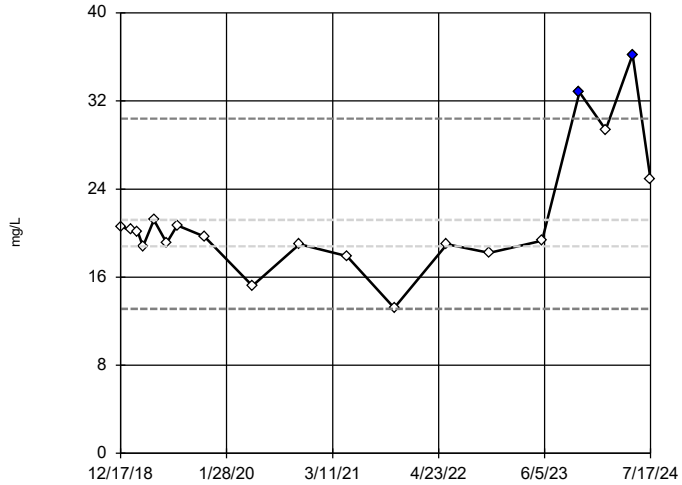
## Tukey's Outlier Screening

LF-MW-1802




n = 19

Outliers are drawn as solid.
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 30.4, low cutoff = 13.11, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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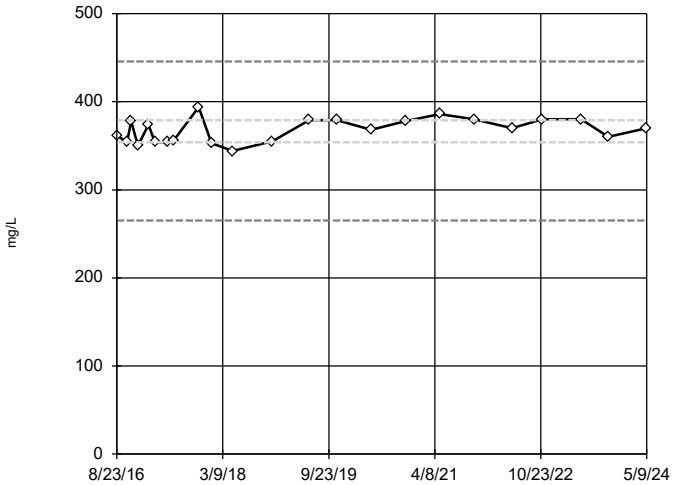
## Tukey's Outlier Screening

LF-MW-2




n = 23

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 445.7, low cutoff = 265.2, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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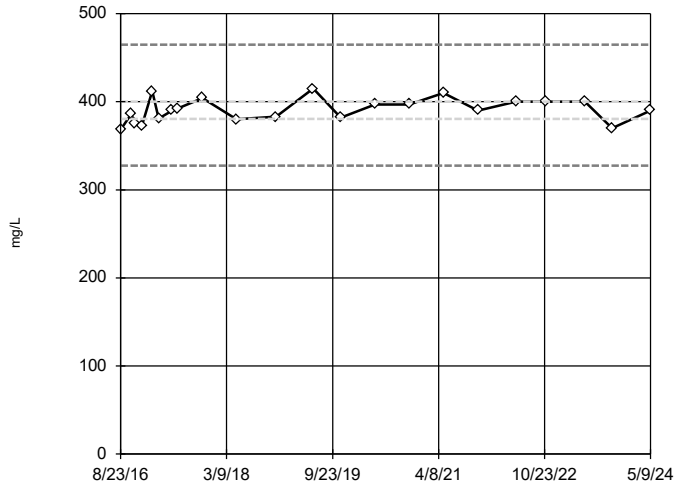
## Tukey's Outlier Screening

LF-MW-4




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

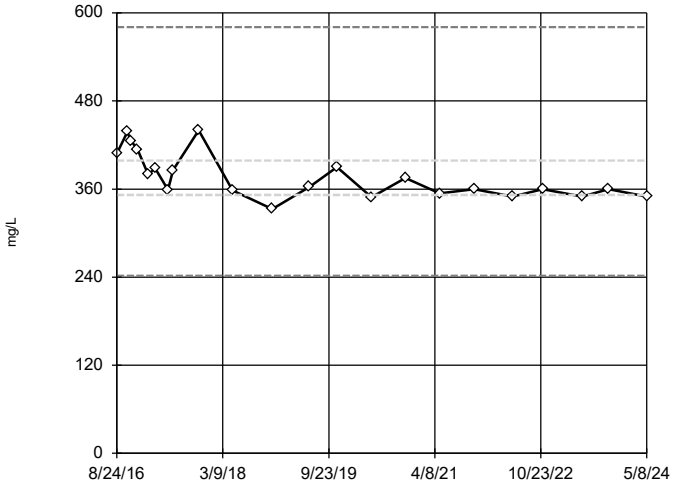
High cutoff = 464.7, low cutoff = 327.5, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

## Tukey's Outlier Screening

LF-MW-6 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 580.6, low cutoff = 241.9, based on IQR multiplier of 3.

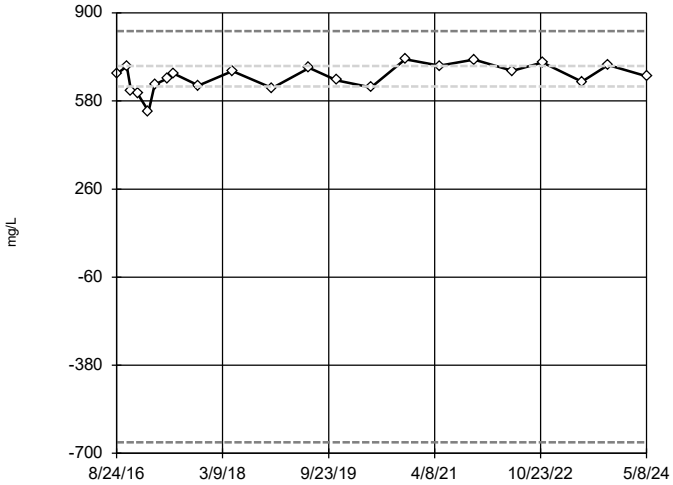
Constituent: Total Dissolved Solids Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF



## Tukey's Outlier Screening

LF-MW-7R (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were x^5 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 833.7, low cutoff = -659.7, based on IQR multiplier of 3.

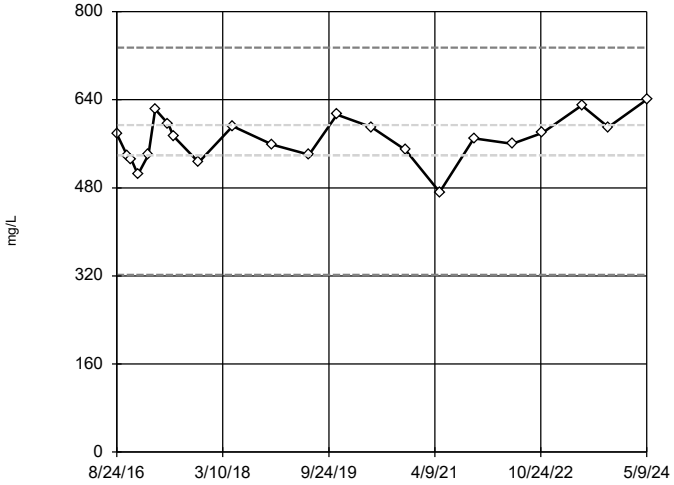
Constituent: Total Dissolved Solids Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF



## Tukey's Outlier Screening

LF-MW-8 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 734.7, low cutoff = 321.8, based on IQR multiplier of 3.

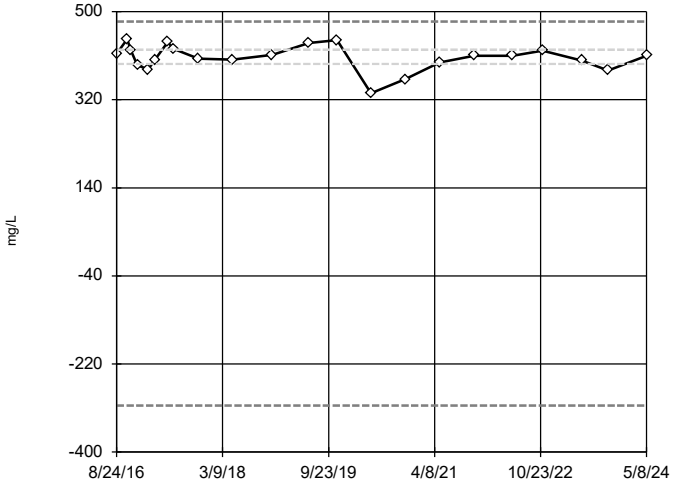
Constituent: Total Dissolved Solids Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF



## Tukey's Outlier Screening

LF-MW-9 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were x^5 transformed to achieve best W statistic (graph shown in original units).

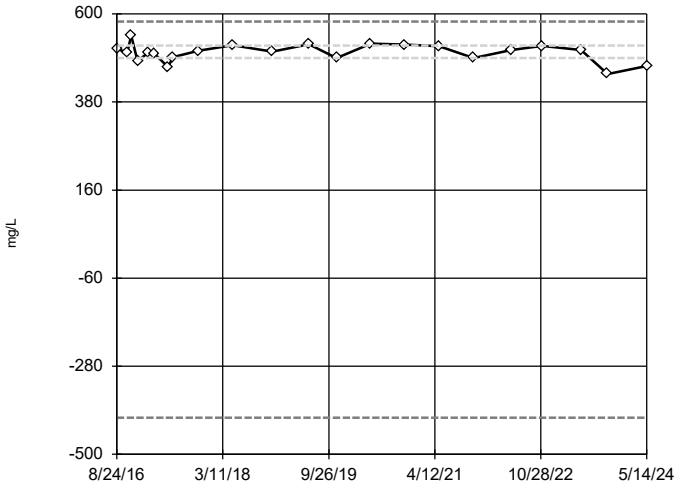
High cutoff = 479.7, low cutoff = -305, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

## Tukey's Outlier Screening

LF-MW-10 (bg)




n = 22

No outliers found. Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 581, low cutoff = -408.4, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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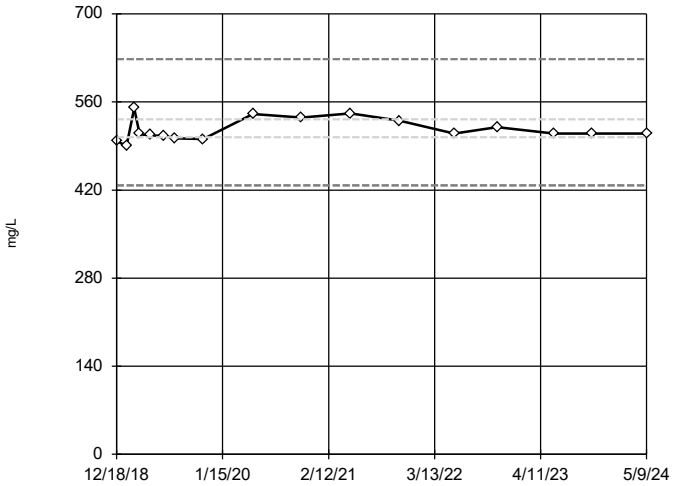
## Tukey's Outlier Screening

LF-MW-1801




n = 17

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 628, low cutoff = 427.3, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

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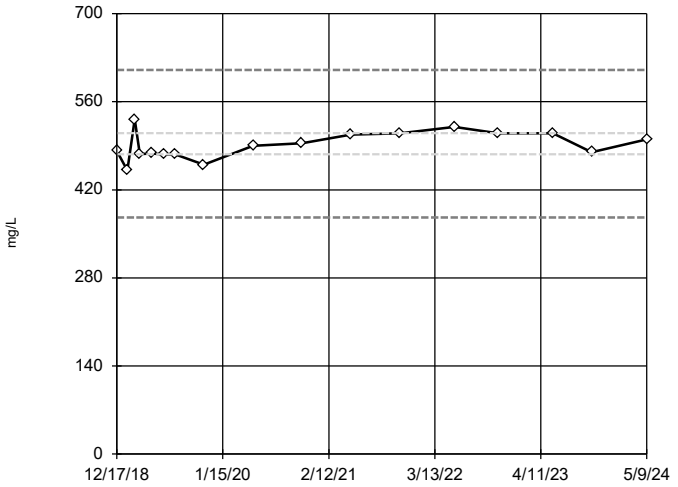
## Tukey's Outlier Screening

LF-MW-1802




n = 17

No outliers found. Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 610.5, low cutoff = 376, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 11/14/2024 2:32 PM View: Outliers

Amos Landfill Client: Geosyntec Data: Amos LF

FIGURE D

Mann-Whitney

# Welch's t-test/Mann-Whitney - Significant Results

Amos Landfill Client: Geosyntec Data: Amos LF Printed 11/18/2024, 2:06 PM

| Constituent | Well | Calc. | 0.01 | Alpha | Sig. | Method |
|---|---|---|---|---|---|---|
| **Calcium (mg/L)** | **LF-MW-1802** | **2.941** | **Yes** | **0.01** | **Yes** | **Mann-W** |
| **Chloride (mg/L)** | **LF-MW-4** | **3.381** | **Yes** | **0.01** | **Yes** | **Mann-W** |
| **Chloride (mg/L)** | **LF-MW-6 (bg)** | **3.291** | **Yes** | **0.01** | **Yes** | **Mann-W** |
| **Chloride (mg/L)** | **LF-MW-8 (bg)** | **3.291** | **Yes** | **0.01** | **Yes** | **Mann-W** |
| **Chloride (mg/L)** | **LF-MW-1801** | **4.136** | **Yes** | **0.01** | **Yes** | **Mann-W** |
| **Chloride (mg/L)** | **LF-MW-1802** | **3.587** | **Yes** | **0.01** | **Yes** | **Mann-W** |
| **pH, field (SU)** | **LF-MW-10 (bg)** | **-3.051** | **Yes** | **0.01** | **Yes** | **Mann-W** |
| **Sulfate (mg/L)** | **LF-MW-1801** | **-3.258** | **Yes** | **0.01** | **Yes** | **Mann-W** |

# Welch's t-test/Mann-Whitney - All Results

Amos Landfill Client: Geosyntec Data: Amos LF Printed 11/18/2024, 2:06 PM

| Constituent | Well | Calc. | 0.01 | Alpha | Sig. | Method |
|---|---|---|---|---|---|---|
| Boron (mg/L) | LF-MW-2 | 0.1866 | No | 0.01 | No | Mann-W |
| Boron (mg/L) | LF-MW-4 | -1.456 | No | 0.01 | No | Mann-W |
| Boron (mg/L) | LF-MW-6 (bg) | -1.607 | No | 0.01 | No | Mann-W |
| Boron (mg/L) | LF-MW-7R (bg) | -1.019 | No | 0.01 | No | Mann-W |
| Boron (mg/L) | LF-MW-8 (bg) | -1.848 | No | 0.01 | No | Mann-W |
| Boron (mg/L) | LF-MW-9 (bg) | -0.9426 | No | 0.01 | No | Mann-W |
| Boron (mg/L) | LF-MW-10 (bg) | -1.766 | No | 0.01 | No | Mann-W |
| Boron (mg/L) | LF-MW-1801 | -0.4746 | No | 0.01 | No | Mann-W |
| Boron (mg/L) | LF-MW-1802 | 0.1582 | No | 0.01 | No | Mann-W |
| Calcium (mg/L) | LF-MW-2 | 0.3356 | No | 0.01 | No | Mann-W |
| Calcium (mg/L) | LF-MW-4 | 2.348 | No | 0.01 | No | Mann-W |
| Calcium (mg/L) | LF-MW-6 (bg) | 2.116 | No | 0.01 | No | Mann-W |
| Calcium (mg/L) | LF-MW-7R (bg) | 1.607 | No | 0.01 | No | Mann-W |
| Calcium (mg/L) | LF-MW-8 (bg) | -2.551 | No | 0.01 | No | Mann-W |
| Calcium (mg/L) | LF-MW-9 (bg) | -0.9402 | No | 0.01 | No | Mann-W |
| Calcium (mg/L) | LF-MW-10 (bg) | 0.6275 | No | 0.01 | No | Mann-W |
| Calcium (mg/L) | LF-MW-1801 | 1.69 | No | 0.01 | No | Mann-W |
| **Calcium (mg/L)** | **LF-MW-1802** | **2.941** | **Yes** | **0.01** | **Yes** | **Mann-W** |
| Chloride (mg/L) | LF-MW-2 | -0.7053 | No | 0.01 | No | Mann-W |
| **Chloride (mg/L)** | **LF-MW-4** | **3.381** | **Yes** | **0.01** | **Yes** | **Mann-W** |
| **Chloride (mg/L)** | **LF-MW-6 (bg)** | **3.291** | **Yes** | **0.01** | **Yes** | **Mann-W** |
| Chloride (mg/L) | LF-MW-7R (bg) | -0.9407 | No | 0.01 | No | Mann-W |
| **Chloride (mg/L)** | **LF-MW-8 (bg)** | **3.291** | **Yes** | **0.01** | **Yes** | **Mann-W** |
| Chloride (mg/L) | LF-MW-9 (bg) | -2.194 | No | 0.01 | No | Mann-W |
| Chloride (mg/L) | LF-MW-10 (bg) | -0.6193 | No | 0.01 | No | Mann-W |
| **Chloride (mg/L)** | **LF-MW-1801** | **4.136** | **Yes** | **0.01** | **Yes** | **Mann-W** |
| **Chloride (mg/L)** | **LF-MW-1802** | **3.587** | **Yes** | **0.01** | **Yes** | **Mann-W** |
| Fluoride (mg/L) | LF-MW-2 | 2.124 | No | 0.01 | No | Mann-W |
| Fluoride (mg/L) | LF-MW-4 | -2.564 | No | 0.01 | No | Mann-W |
| Fluoride (mg/L) | LF-MW-6 (bg) | -0.9993 | No | 0.01 | No | Mann-W |
| Fluoride (mg/L) | LF-MW-7R (bg) | -0.3545 | No | 0.01 | No | Mann-W |
| Fluoride (mg/L) | LF-MW-8 (bg) | 0.1993 | No | 0.01 | No | Mann-W |
| Fluoride (mg/L) | LF-MW-9 (bg) | 0.3174 | No | 0.01 | No | Mann-W |
| Fluoride (mg/L) | LF-MW-10 (bg) | -1.075 | No | 0.01 | No | Mann-W |
| Fluoride (mg/L) | LF-MW-1801 | 0.3694 | No | 0.01 | No | Mann-W |
| Fluoride (mg/L) | LF-MW-1802 | 1.156 | No | 0.01 | No | Mann-W |
| pH, field (SU) | LF-MW-2 | 1.098 | No | 0.01 | No | Mann-W |
| pH, field (SU) | LF-MW-4 | -0.6091 | No | 0.01 | No | Mann-W |
| pH, field (SU) | LF-MW-6 (bg) | -2.079 | No | 0.01 | No | Mann-W |
| pH, field (SU) | LF-MW-7R (bg) | -1.452 | No | 0.01 | No | Mann-W |
| pH, field (SU) | LF-MW-8 (bg) | 1.764 | No | 0.01 | No | Mann-W |
| pH, field (SU) | LF-MW-9 (bg) | -0.7059 | No | 0.01 | No | Mann-W |
| **pH, field (SU)** | **LF-MW-10 (bg)** | **-3.051** | **Yes** | **0.01** | **Yes** | **Mann-W** |
| pH, field (SU) | LF-MW-1801 | -2.192 | No | 0.01 | No | Mann-W |
| pH, field (SU) | LF-MW-1802 | -0.8508 | No | 0.01 | No | Mann-W |
| Sulfate (mg/L) | LF-MW-2 | 0.4706 | No | 0.01 | No | Mann-W |
| Sulfate (mg/L) | LF-MW-4 | 1.686 | No | 0.01 | No | Mann-W |
| Sulfate (mg/L) | LF-MW-6 (bg) | -1.646 | No | 0.01 | No | Mann-W |
| Sulfate (mg/L) | LF-MW-7R (bg) | -0.392 | No | 0.01 | No | Mann-W |
| Sulfate (mg/L) | LF-MW-8 (bg) | 2.518 | No | 0.01 | No | Mann-W |
| Sulfate (mg/L) | LF-MW-9 (bg) | -2.155 | No | 0.01 | No | Mann-W |
| Sulfate (mg/L) | LF-MW-10 (bg) | -1.922 | No | 0.01 | No | Mann-W |
| **Sulfate (mg/L)** | **LF-MW-1801** | **-3.258** | **Yes** | **0.01** | **Yes** | **Mann-W** |
| Sulfate (mg/L) | LF-MW-1802 | 1.606 | No | 0.01 | No | Mann-W |

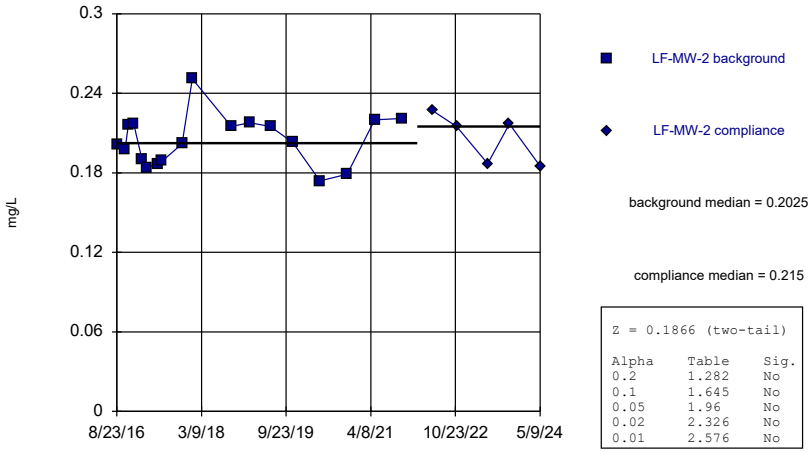
# Welch's t-test/Mann-Whitney - All Results

Amos Landfill Client: Geosyntec Data: Amos LF Printed 11/18/2024, 2:06 PM

| Constituent | Well | Calc. | 0.01 | Alpha | Sig. | Method |
|---|---|---|---|---|---|---|
| Total Dissolved Solids (mg/L) | LF-MW-2 | 1.009 | No | 0.01 | No | Mann-W |
| Total Dissolved Solids (mg/L) | LF-MW-4 | 0.4713 | No | 0.01 | No | Mann-W |
| Total Dissolved Solids (mg/L) | LF-MW-6 (bg) | -2.042 | No | 0.01 | No | Mann-W |
| Total Dissolved Solids (mg/L) | LF-MW-7R (bg) | 1.175 | No | 0.01 | No | Mann-W |
| Total Dissolved Solids (mg/L) | LF-MW-8 (bg) | 1.921 | No | 0.01 | No | Mann-W |
| Total Dissolved Solids (mg/L) | LF-MW-9 (bg) | -0.5886 | No | 0.01 | No | Mann-W |
| Total Dissolved Solids (mg/L) | LF-MW-10 (bg) | -0.7841 | No | 0.01 | No | Mann-W |
| Total Dissolved Solids (mg/L) | LF-MW-1801 | 0.4773 | No | 0.01 | No | Mann-W |
| Total Dissolved Solids (mg/L) | LF-MW-1802 | 1.745 | No | 0.01 | No | Mann-W |

## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-2




background median = 0.2025

compliance median = 0.215

Z = 0.1866 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

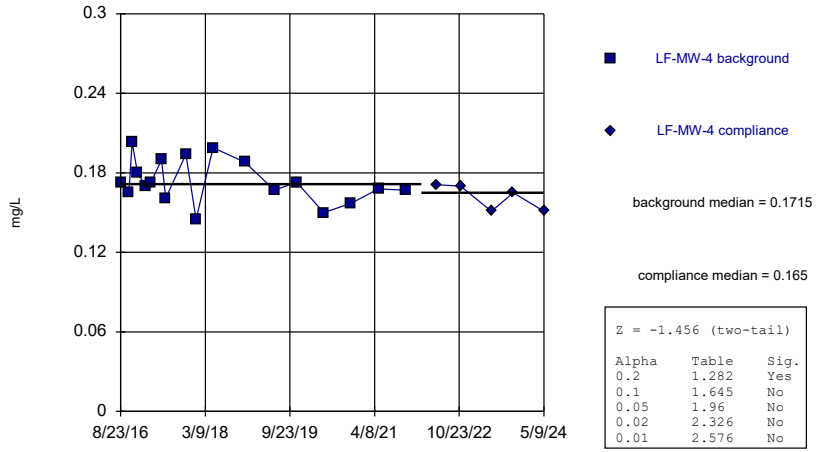
Constituent: Boron Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney

Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-4




background median = 0.1715

compliance median = 0.165

Z = -1.456 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

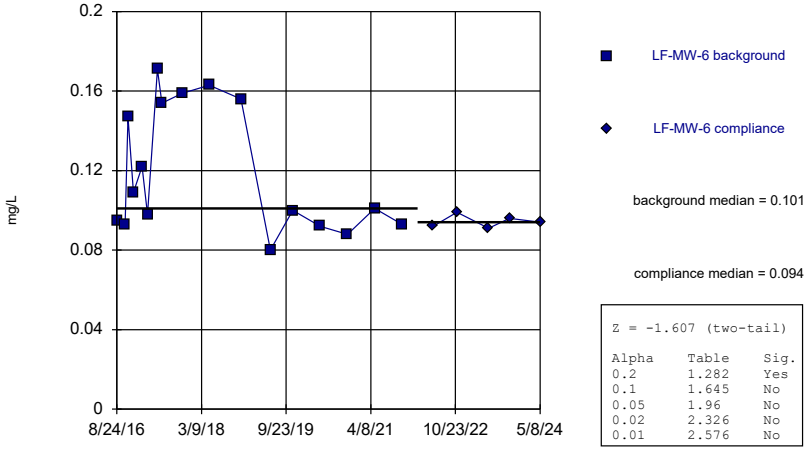
Constituent: Boron Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney

Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-6 (bg)




background median = 0.101

compliance median = 0.094

Z = -1.607 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

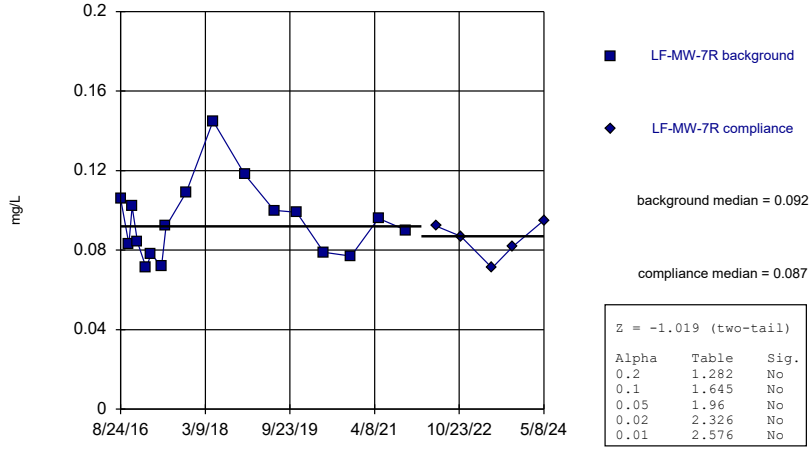
Constituent: Boron Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney

Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-7R (bg)




background median = 0.092

compliance median = 0.087

Z = -1.019 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

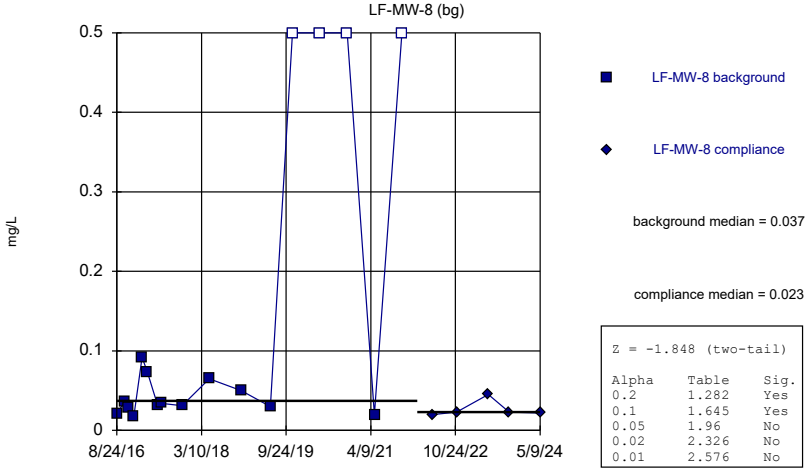
Constituent: Boron Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney

Amos Landfill Client: Geosyntec Data: Amos LF

Hollow symbols indicate censored values.

## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-8 (bg)




Z = -1.848 (two-tail)

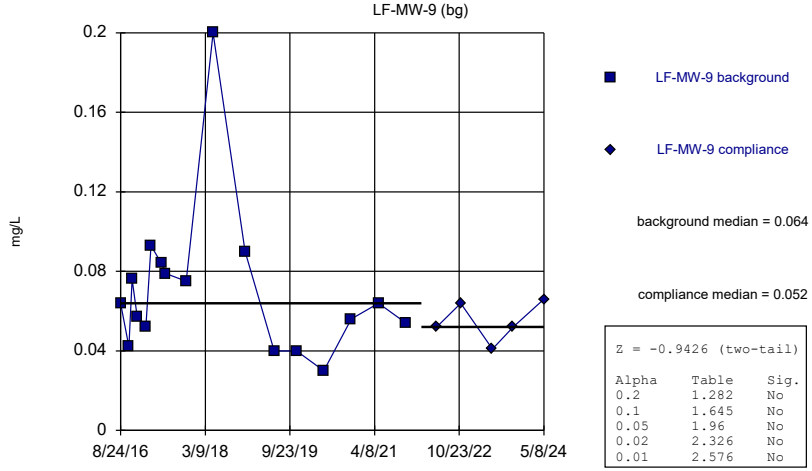
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Boron Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-9 (bg)




Z = -0.9426 (two-tail)

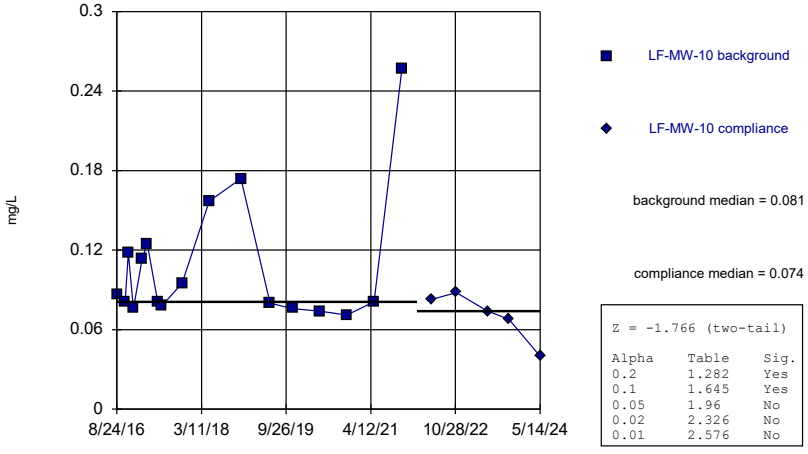
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Boron Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-10 (bg)




Z = -1.766 (two-tail)

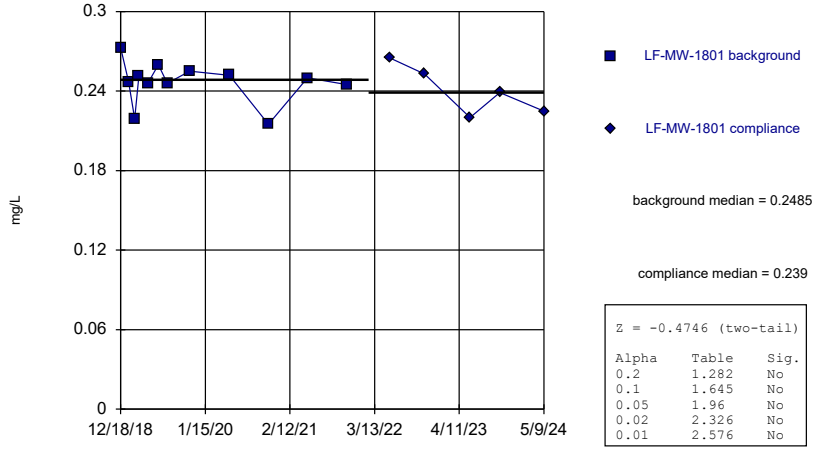
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Boron Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-1801



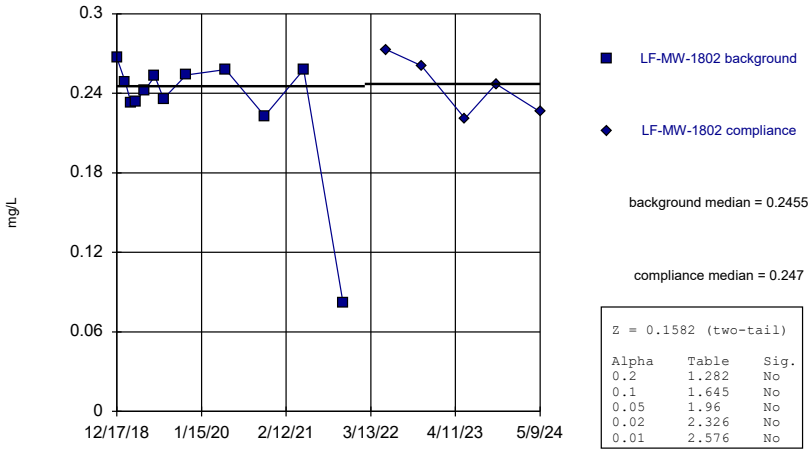

Z = -0.4746 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Boron Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-1802

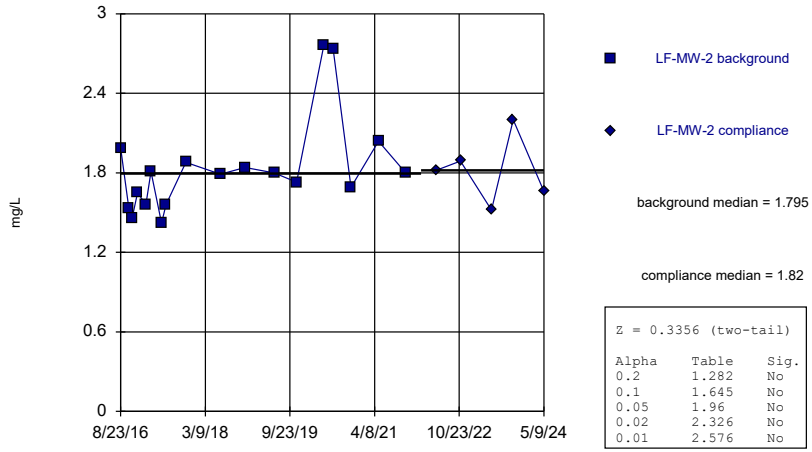



Constituent: Boron Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-2

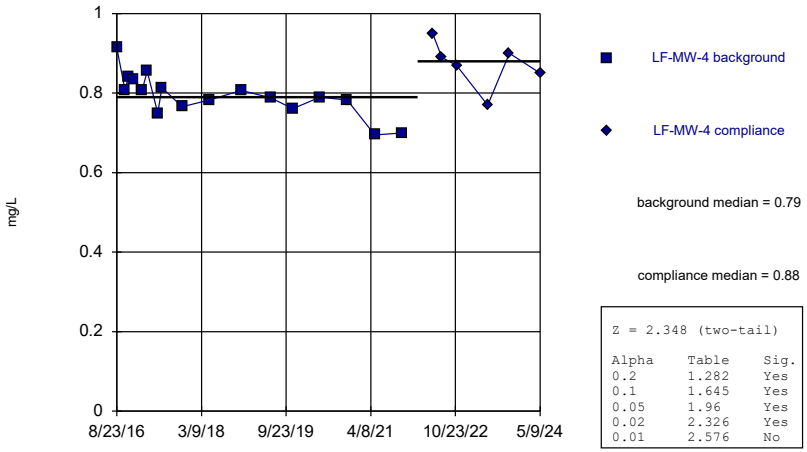



Constituent: Calcium Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-4

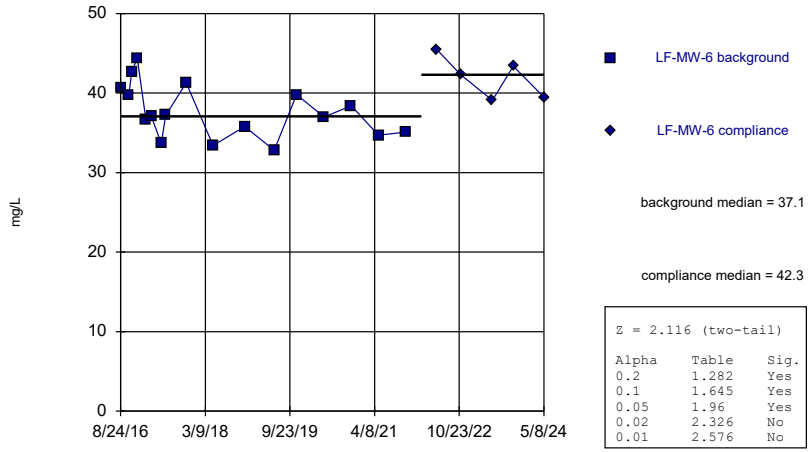



Constituent: Calcium Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

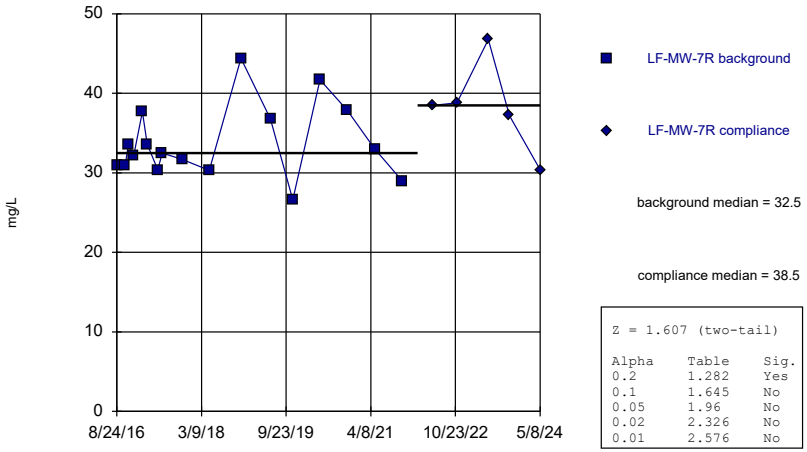
LF-MW-6 (bg)




Constituent: Calcium Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-7R (bg)




Z = 1.607 (two-tail)

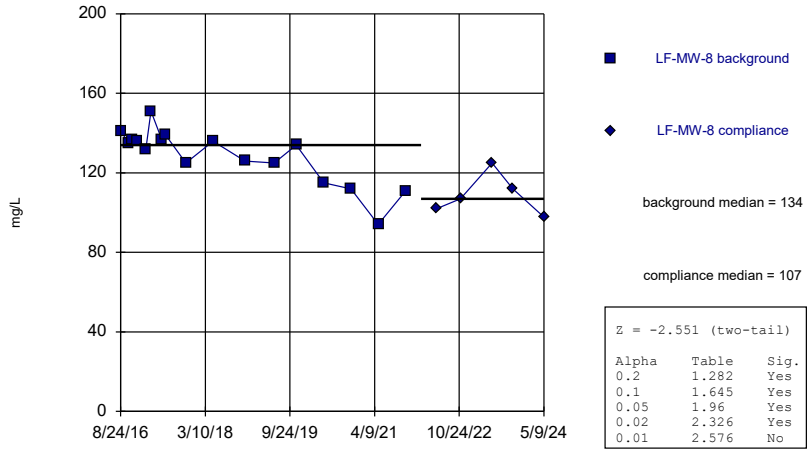
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Calcium Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-8 (bg)




Z = -2.551 (two-tail)

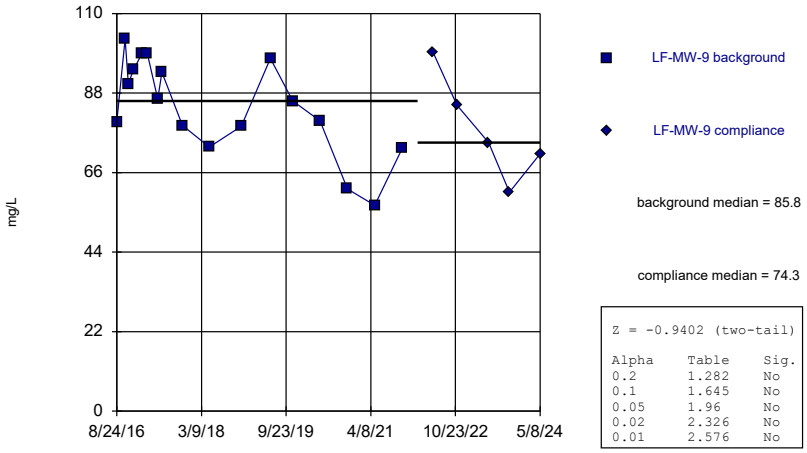
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | Yes |
| 0.02 | 2.326 | Yes |
| 0.01 | 2.576 | No |

Constituent: Calcium Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-9 (bg)




Z = -0.9402 (two-tail)

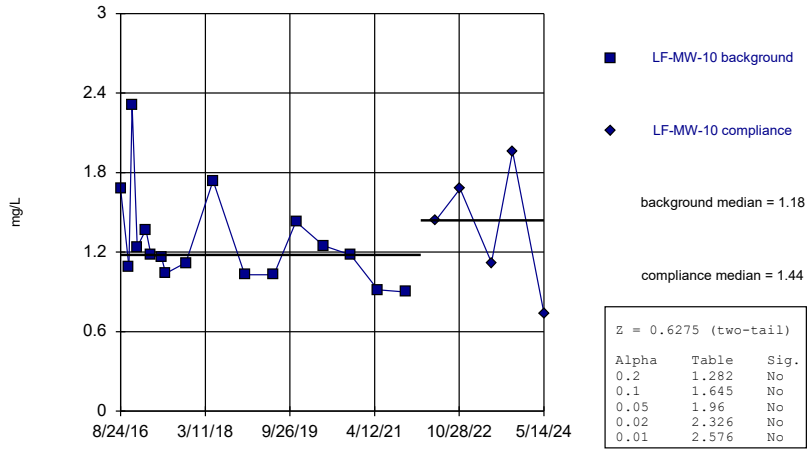
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Calcium Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-10 (bg)



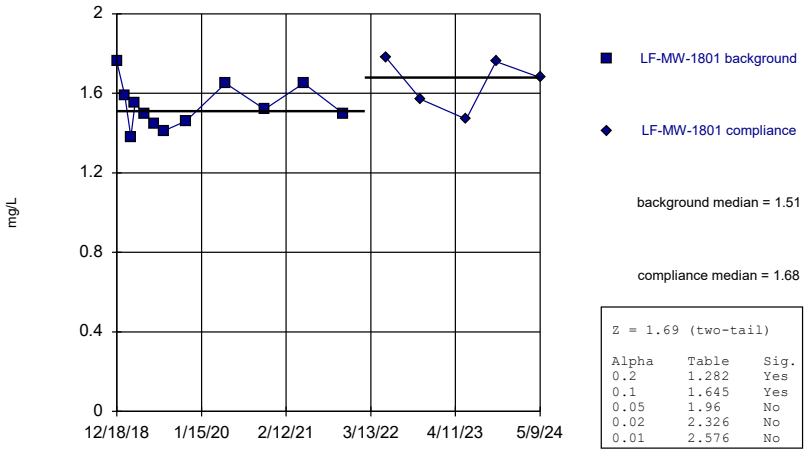

Z = 0.6275 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Calcium Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-1801




Z = 1.69 (two-tail)

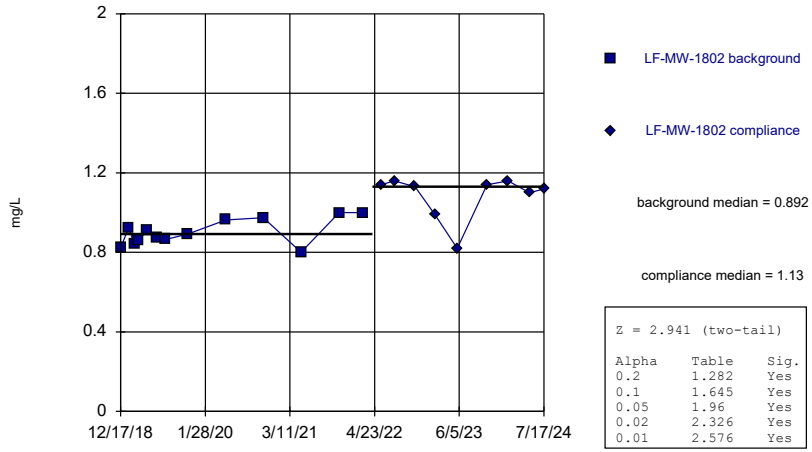
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Calcium Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-1802




Z = 2.941 (two-tail)

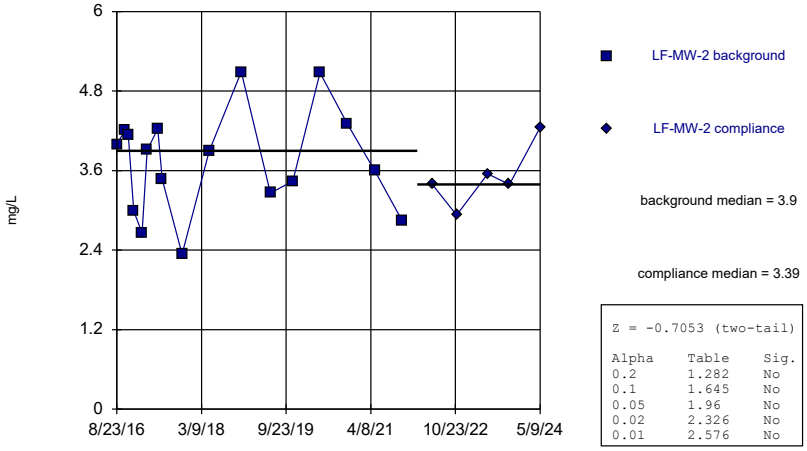
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | Yes |
| 0.02 | 2.326 | Yes |
| 0.01 | 2.576 | Yes |

Constituent: Calcium Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-2




Z = -0.7053 (two-tail)

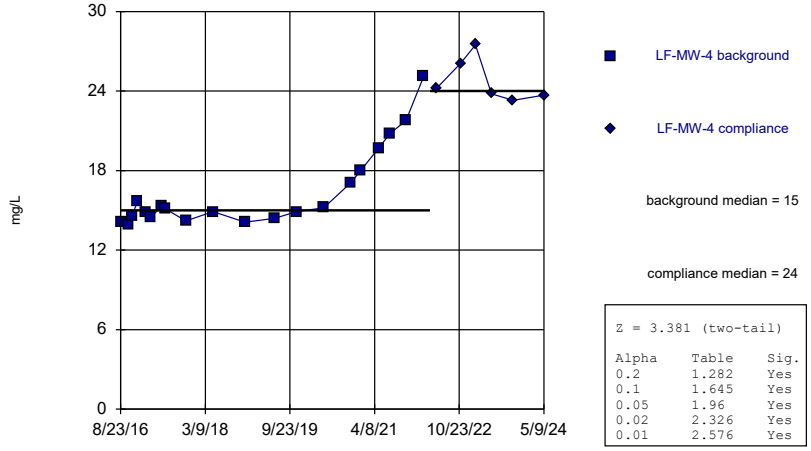
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Chloride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-4



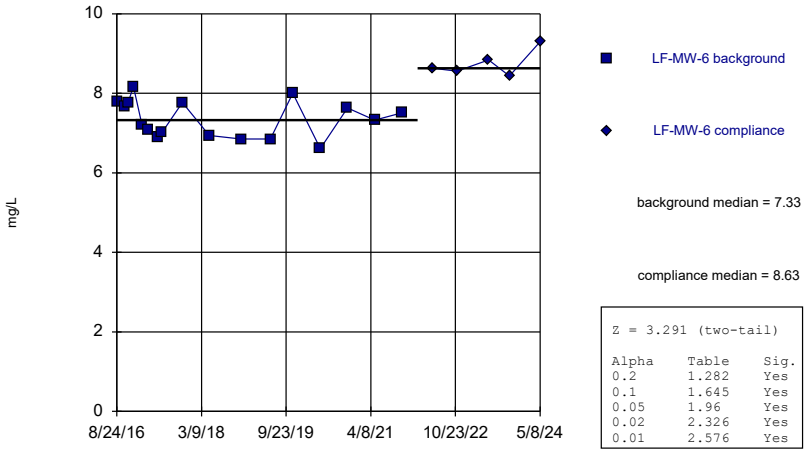

Z = 3.381 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | Yes |
| 0.02 | 2.326 | Yes |
| 0.01 | 2.576 | Yes |

Constituent: Chloride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-6 (bg)




Z = 3.291 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | Yes |
| 0.02 | 2.326 | Yes |
| 0.01 | 2.576 | Yes |

Constituent: Chloride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

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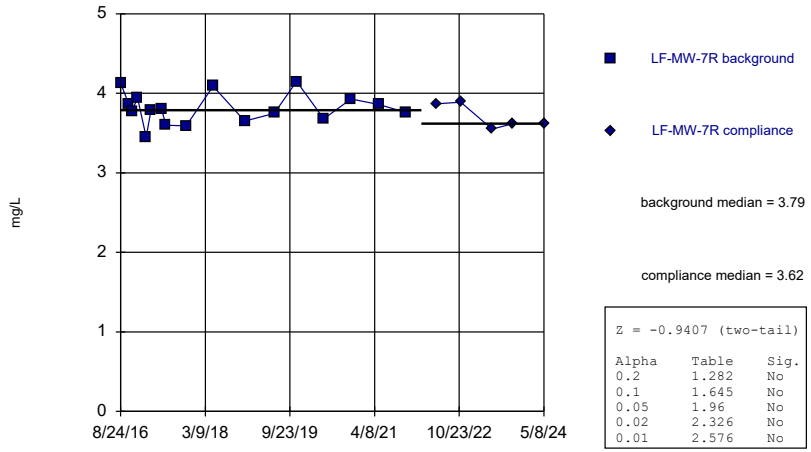
## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-7R (bg)




Z = -0.9407 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Chloride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

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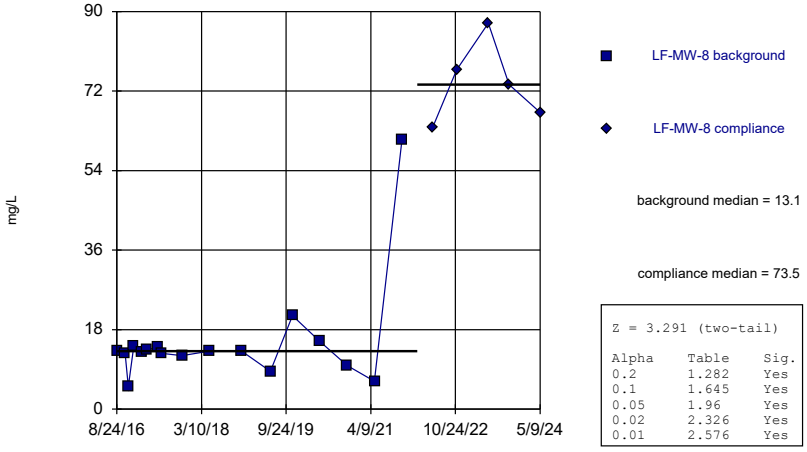
## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-8 (bg)




Z = 3.291 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | Yes |
| 0.02 | 2.326 | Yes |
| 0.01 | 2.576 | Yes |

Constituent: Chloride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

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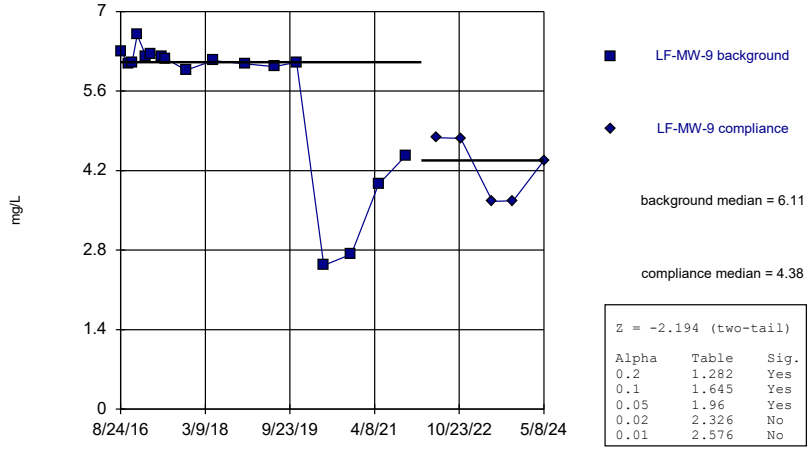
## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-9 (bg)



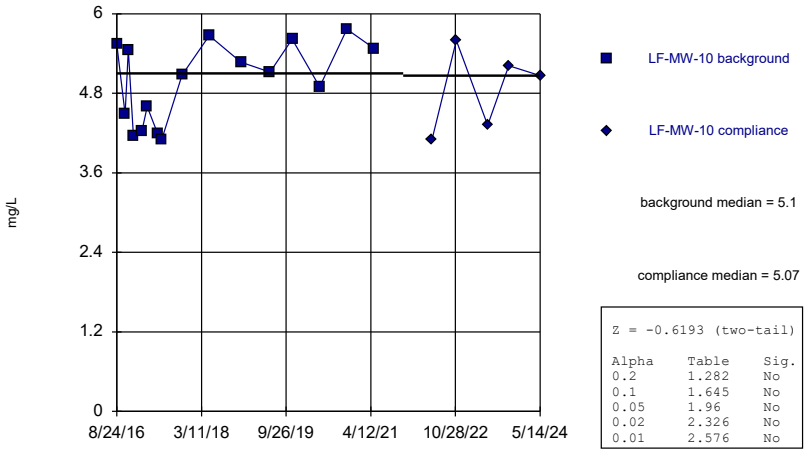

Z = -2.194 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | Yes |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Chloride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-10 (bg)




Z = -0.6193 (two-tail)

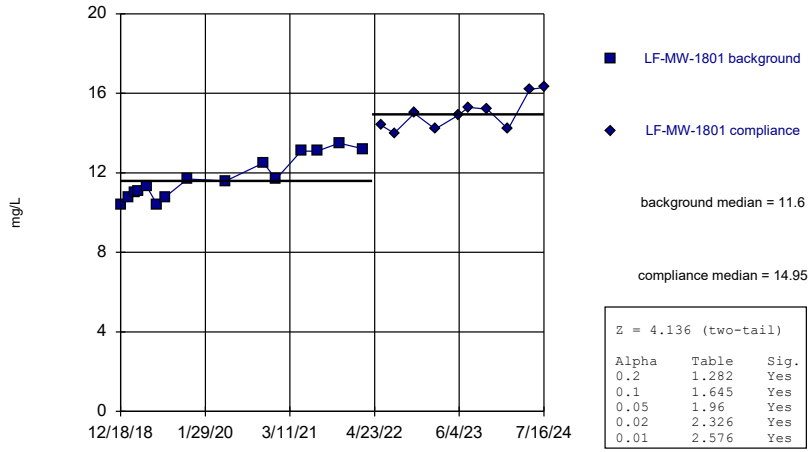
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Chloride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-1801




Z = 4.136 (two-tail)

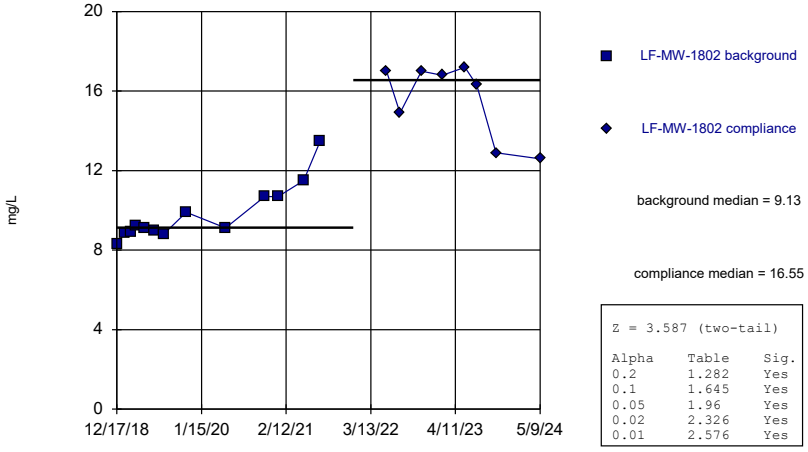
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | Yes |
| 0.02 | 2.326 | Yes |
| 0.01 | 2.576 | Yes |

Constituent: Chloride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-1802




Z = 3.587 (two-tail)

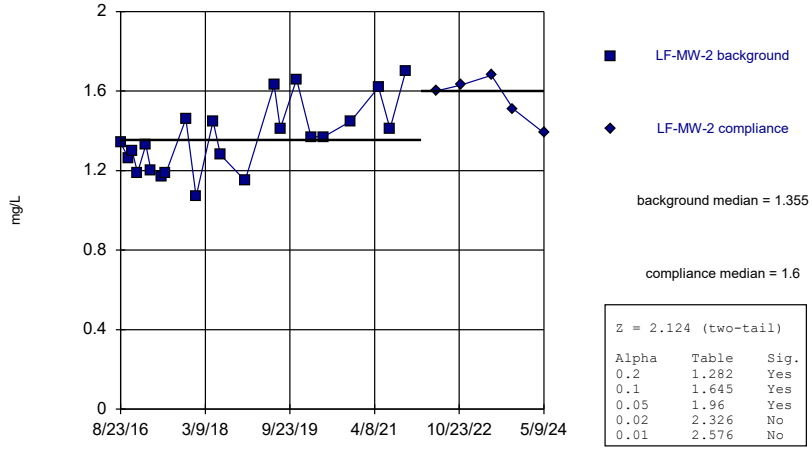
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | Yes |
| 0.02 | 2.326 | Yes |
| 0.01 | 2.576 | Yes |

Constituent: Chloride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-2



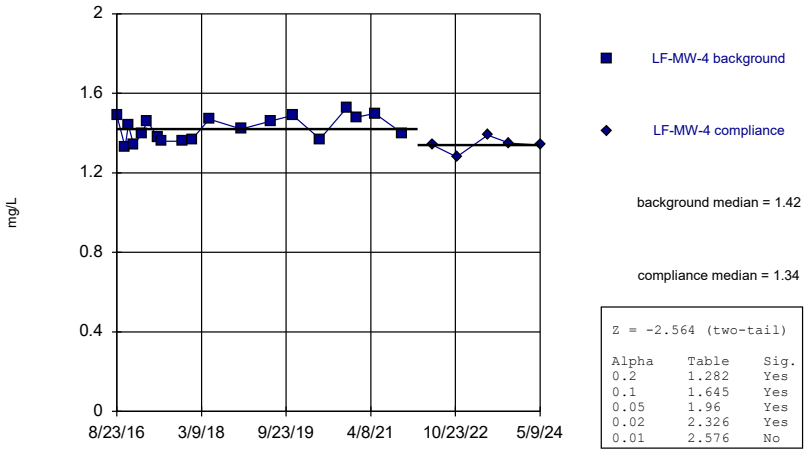

Z = 2.124 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | Yes |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Fluoride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-4




Z = -2.564 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | Yes |
| 0.02 | 2.326 | Yes |
| 0.01 | 2.576 | No |

Constituent: Fluoride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

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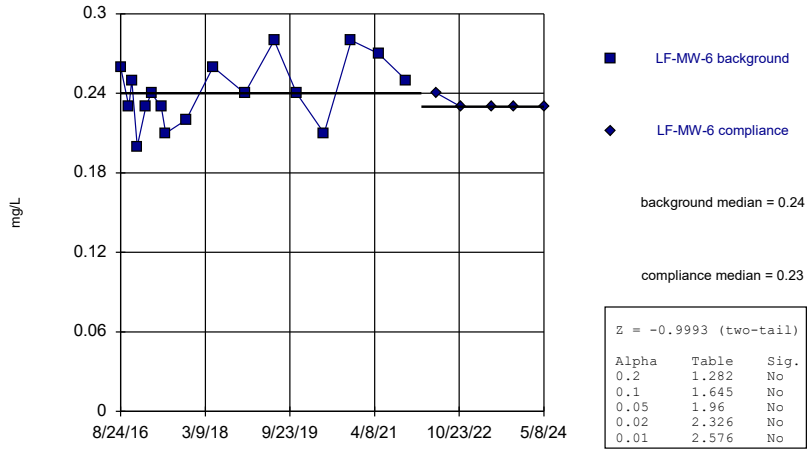
## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-6 (bg)




Z = -0.9993 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Fluoride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

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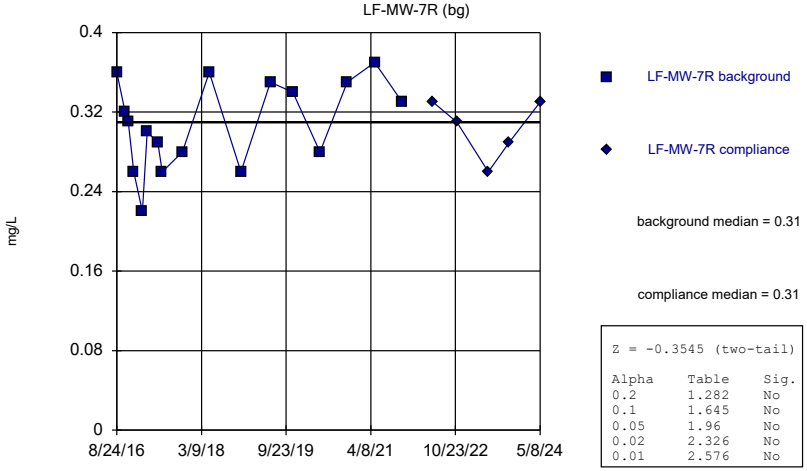
## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-7R (bg)




Z = -0.3545 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Fluoride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

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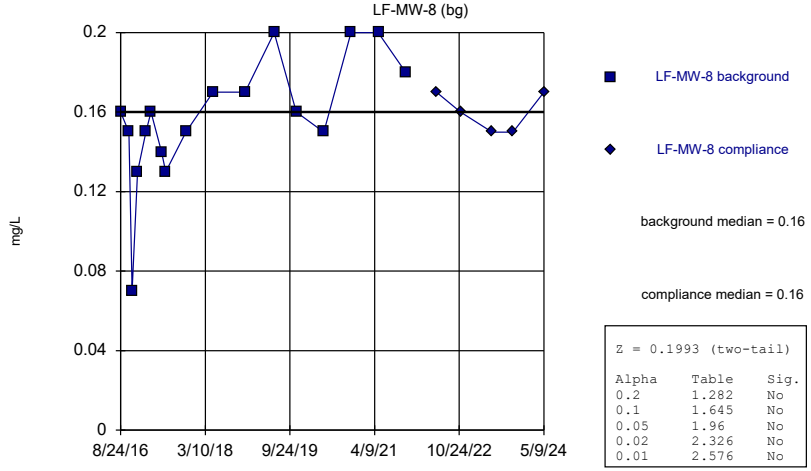
## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-8 (bg)



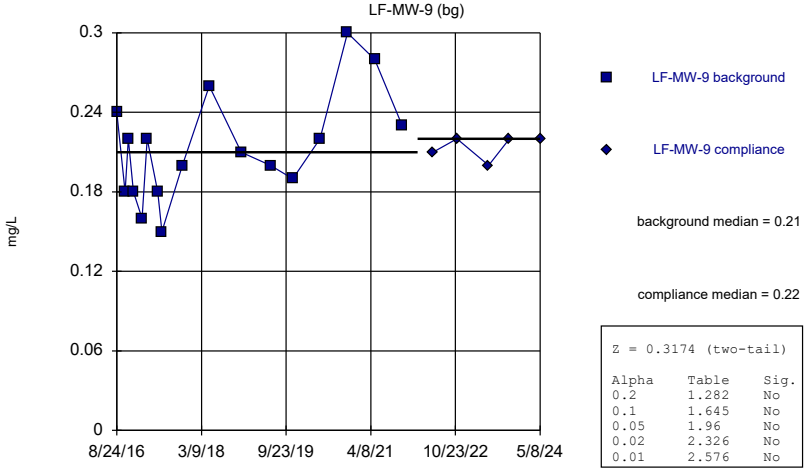

Z = 0.1993 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Fluoride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-9 (bg)




Z = 0.3174 (two-tail)

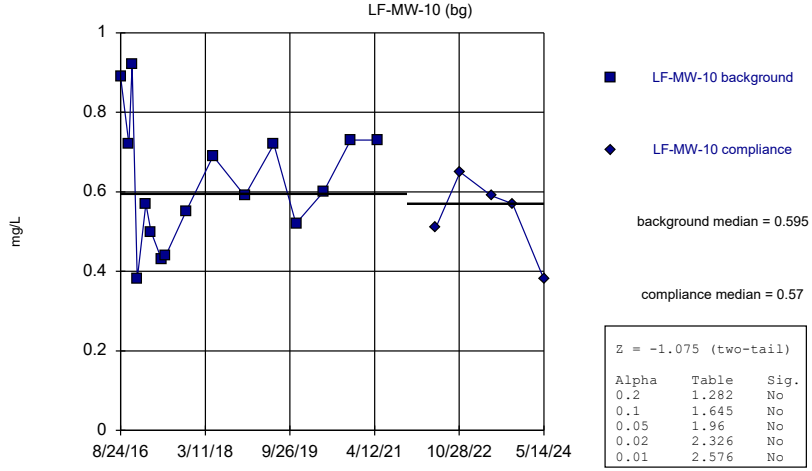
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Fluoride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-10 (bg)




Z = -1.075 (two-tail)

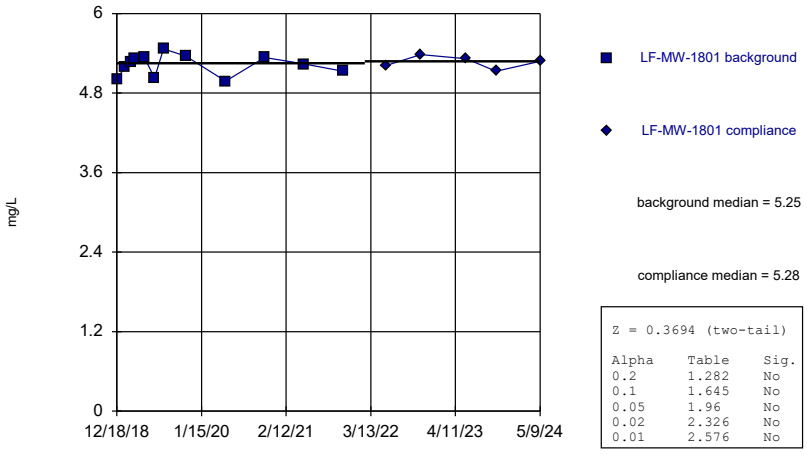
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Fluoride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-1801




Z = 0.3694 (two-tail)

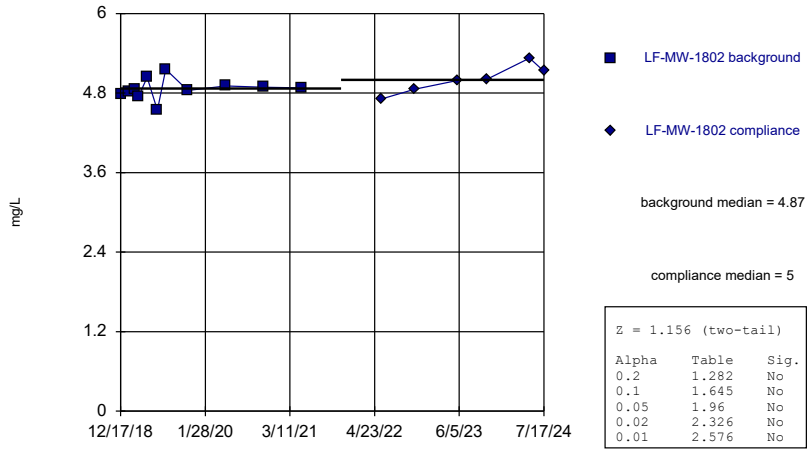
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Fluoride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-1802



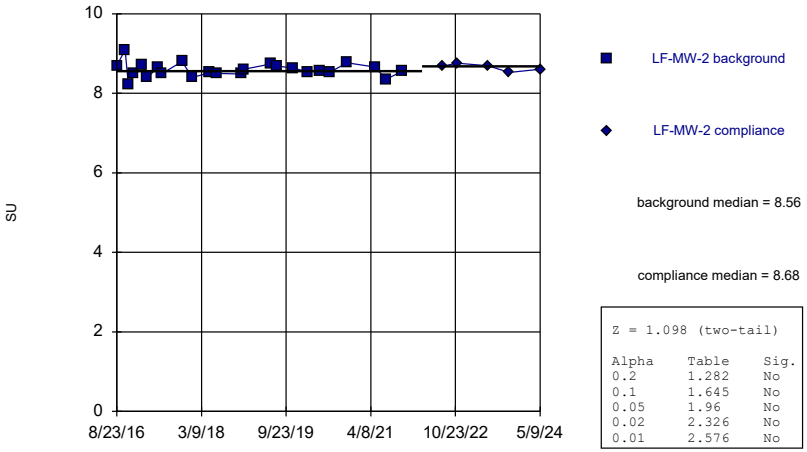

Z = 1.156 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Fluoride Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-2




Constituent: pH, field Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

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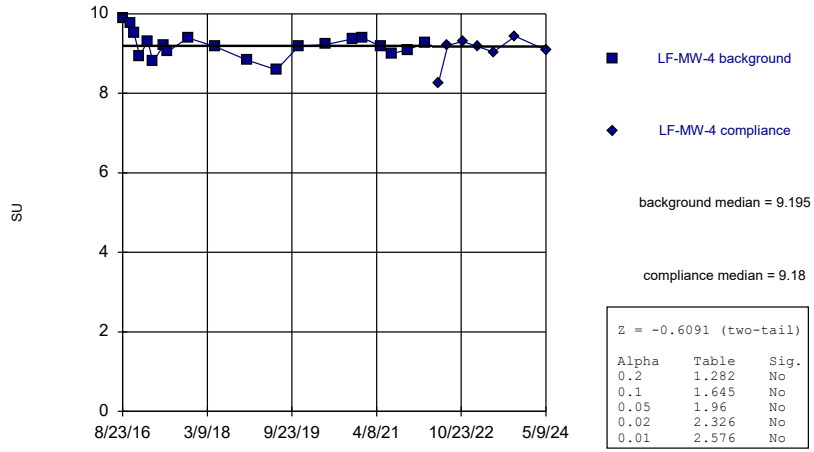
## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-4




Constituent: pH, field Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

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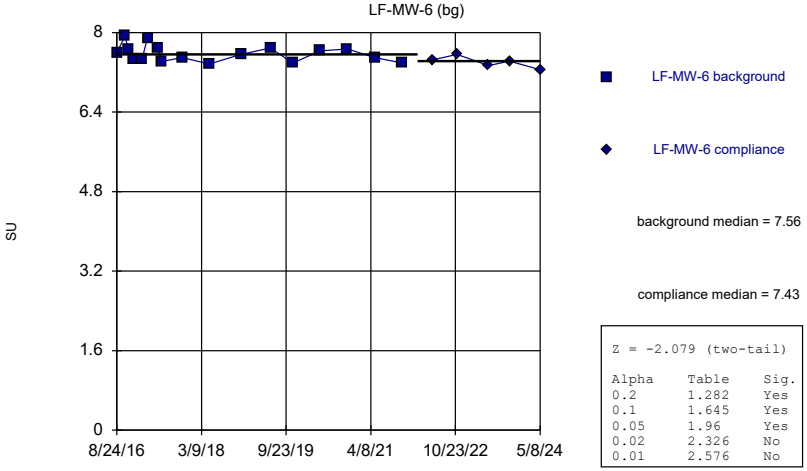
## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-6 (bg)




Constituent: pH, field Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

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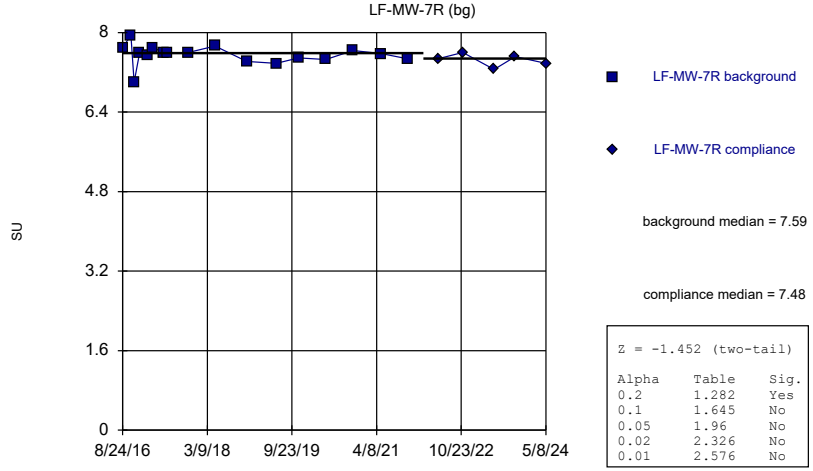
## Mann-Whitney (Wilcoxon Rank Sum)

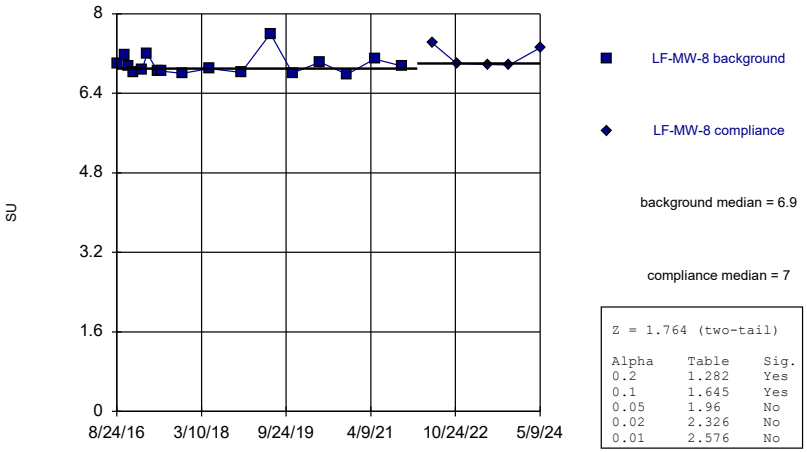
LF-MW-7R (bg)




Constituent: pH, field Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-8 (bg)




Z = 1.764 (two-tail)

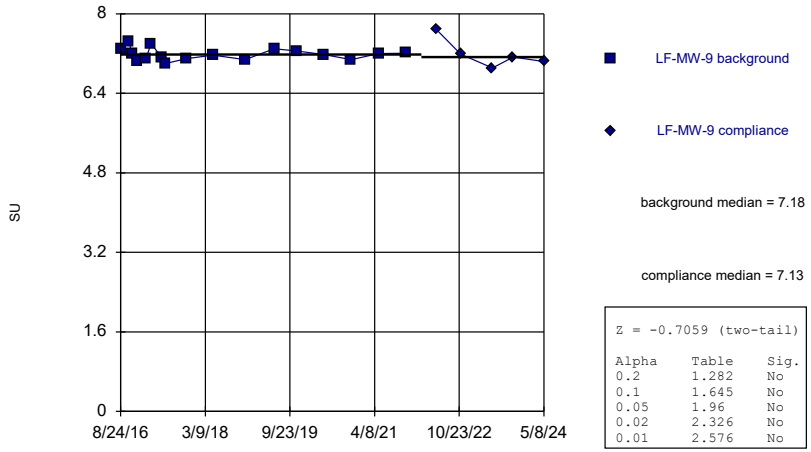
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: pH, field Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-9 (bg)




Z = -0.7059 (two-tail)

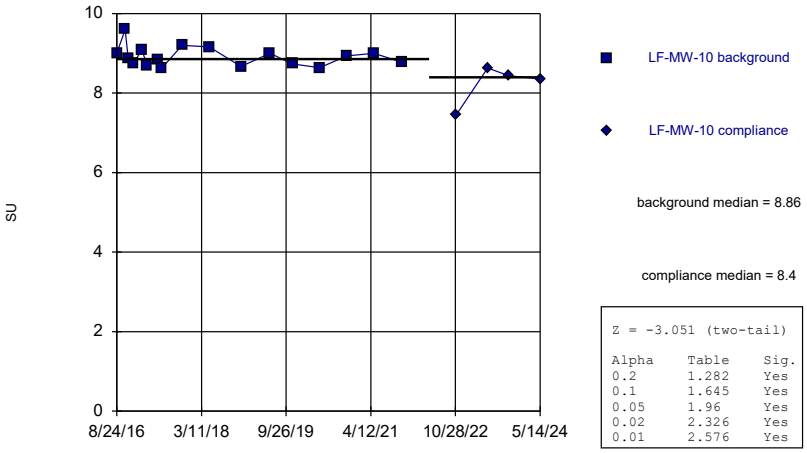
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: pH, field Analysis Run 11/18/2024 2:02 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-10 (bg)




Z = -3.051 (two-tail)

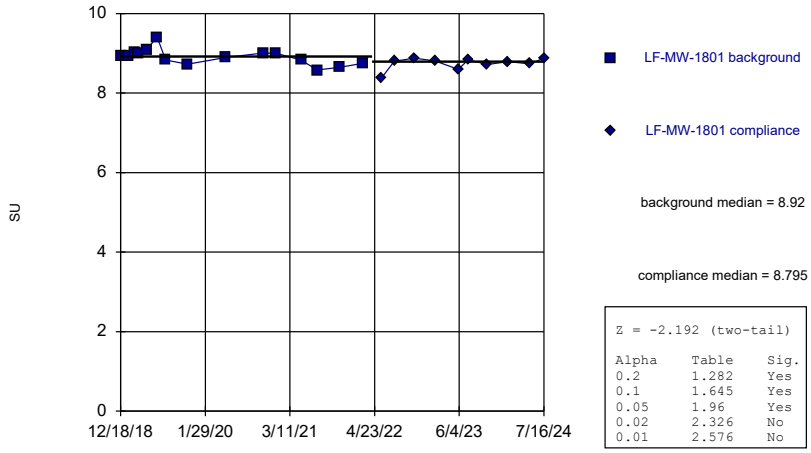
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | Yes |
| 0.02 | 2.326 | Yes |
| 0.01 | 2.576 | Yes |

Constituent: pH, field Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-1801



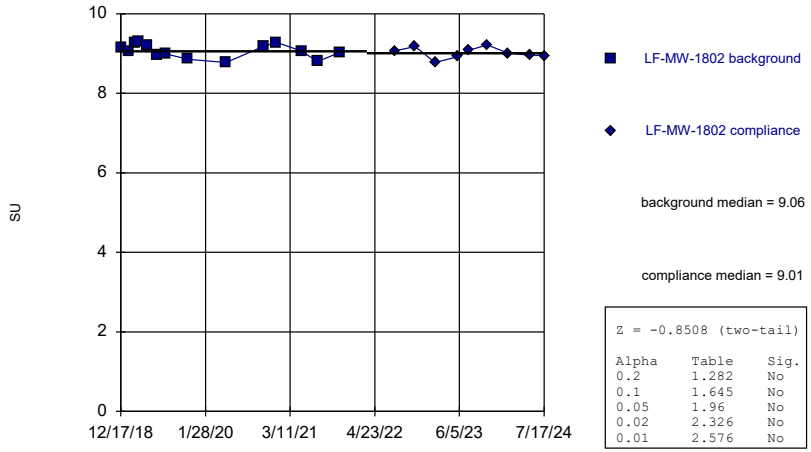

Z = -2.192 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | Yes |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: pH, field Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-1802

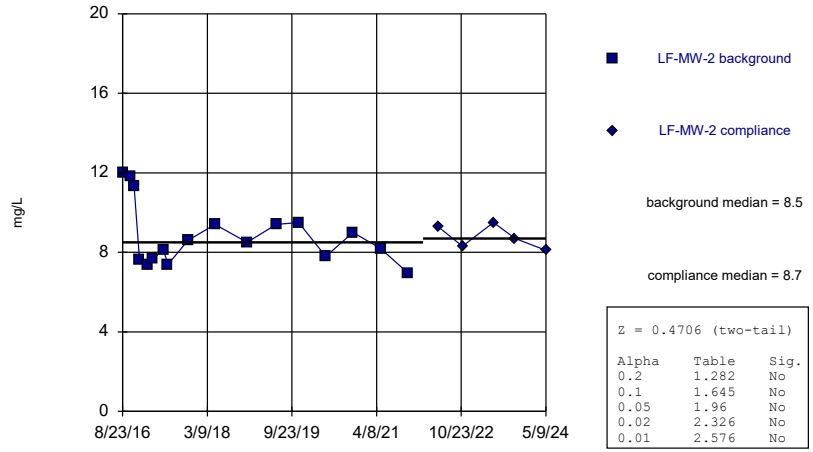



Constituent: pH, field Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-2

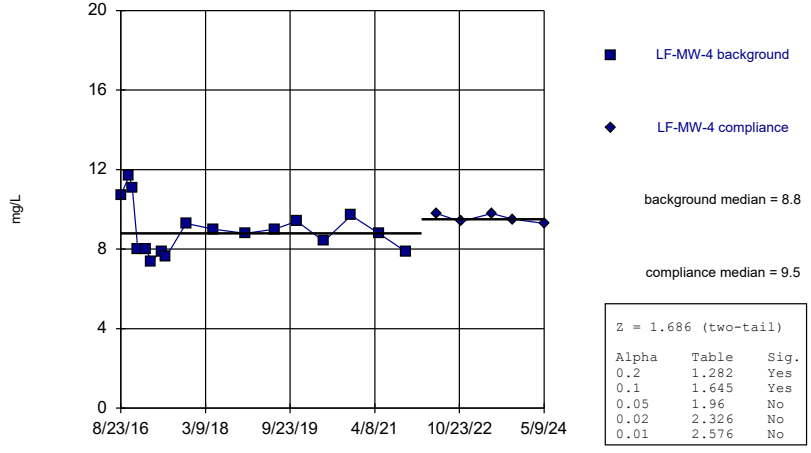



Constituent: Sulfate Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-4

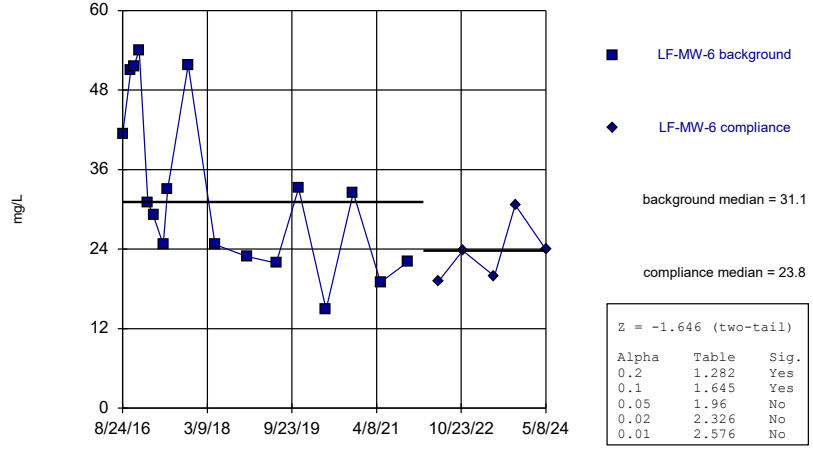



Constituent: Sulfate Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

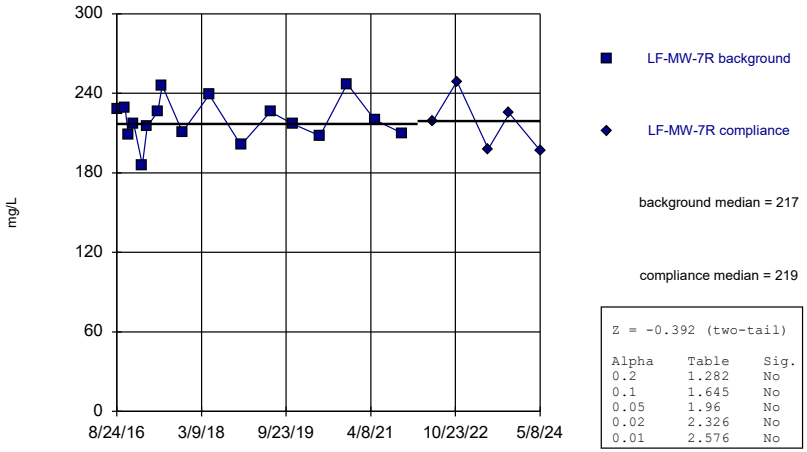
LF-MW-6 (bg)




Constituent: Sulfate Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-7R (bg)




Z = -0.392 (two-tail)

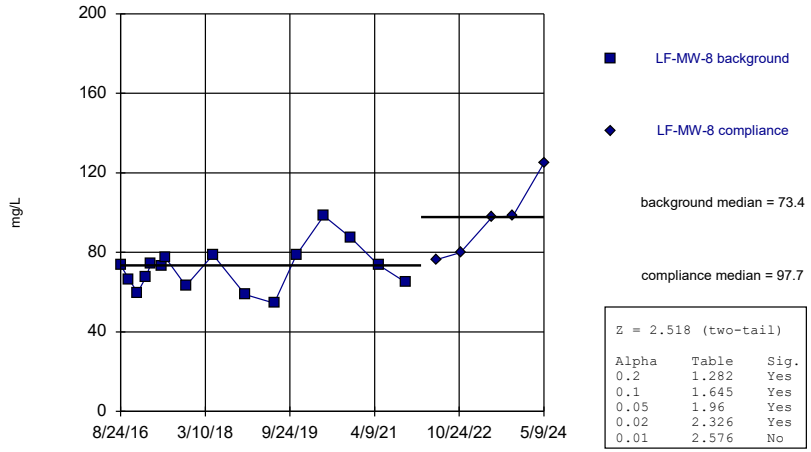
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Sulfate Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-8 (bg)




Z = 2.518 (two-tail)

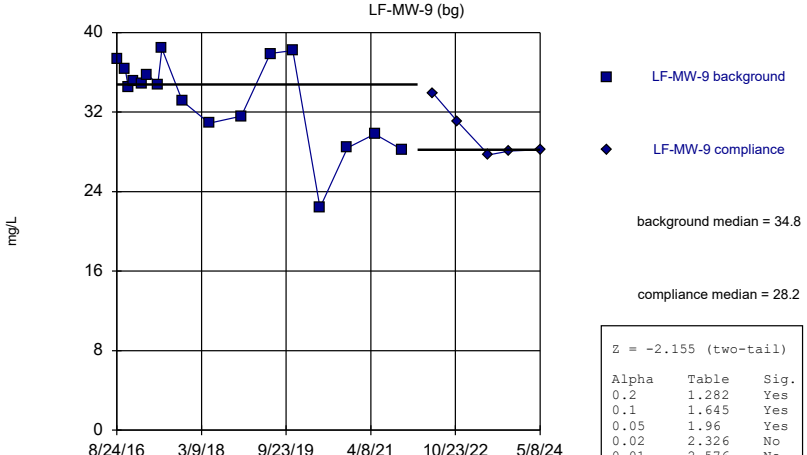
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | Yes |
| 0.02 | 2.326 | Yes |
| 0.01 | 2.576 | No |

Constituent: Sulfate Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-9 (bg)




Z = -2.155 (two-tail)

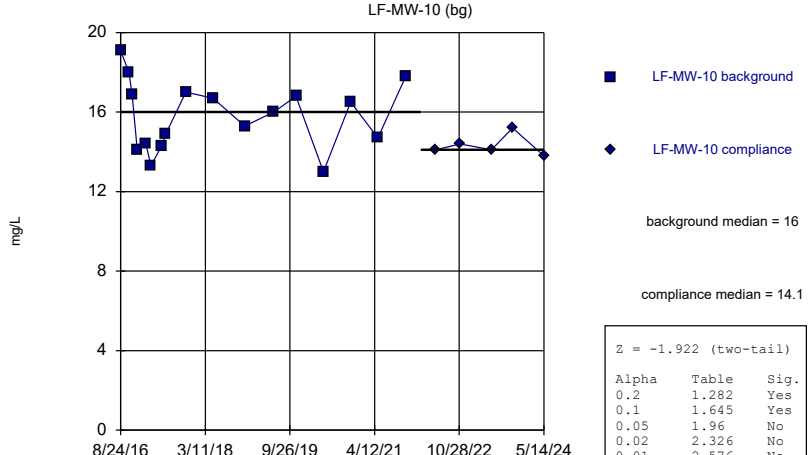
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | Yes |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Sulfate Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-10 (bg)



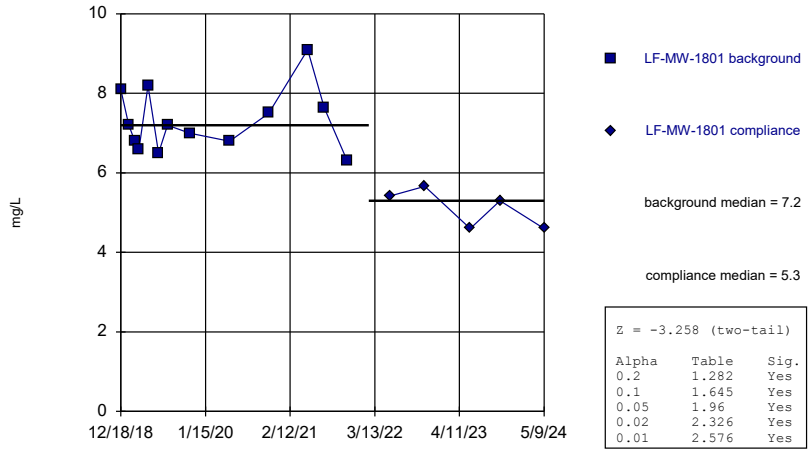

Z = -1.922 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Sulfate Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-1801




Constituent: Sulfate Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

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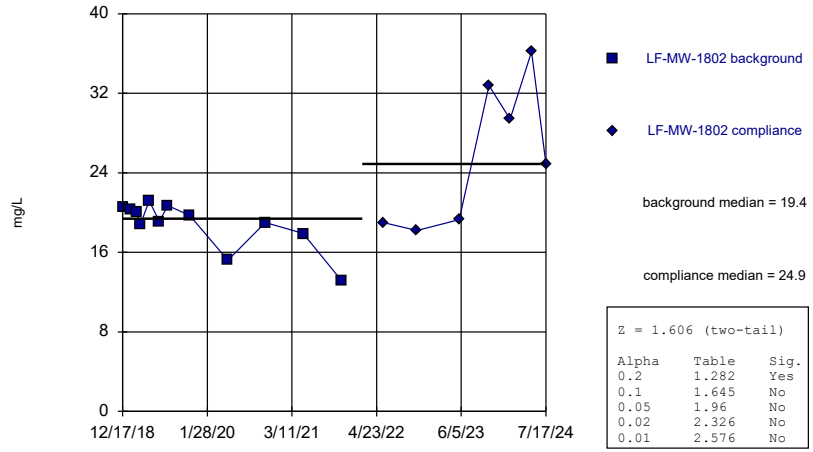
## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-1802




Constituent: Sulfate Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

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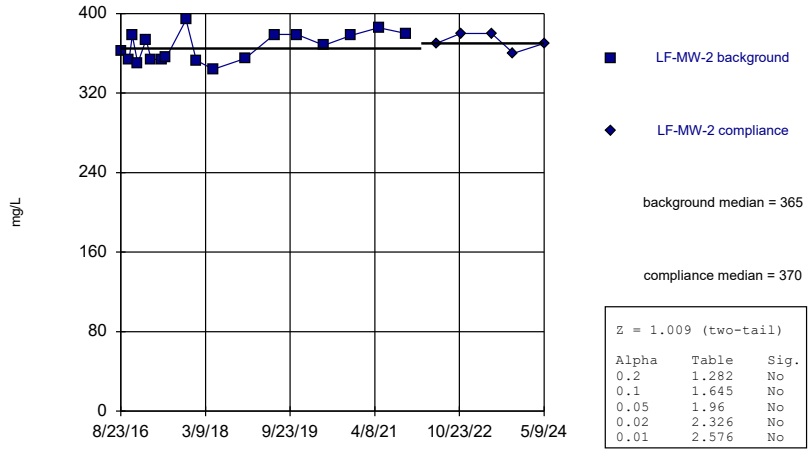
## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-2




Constituent: Total Dissolved Solids Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

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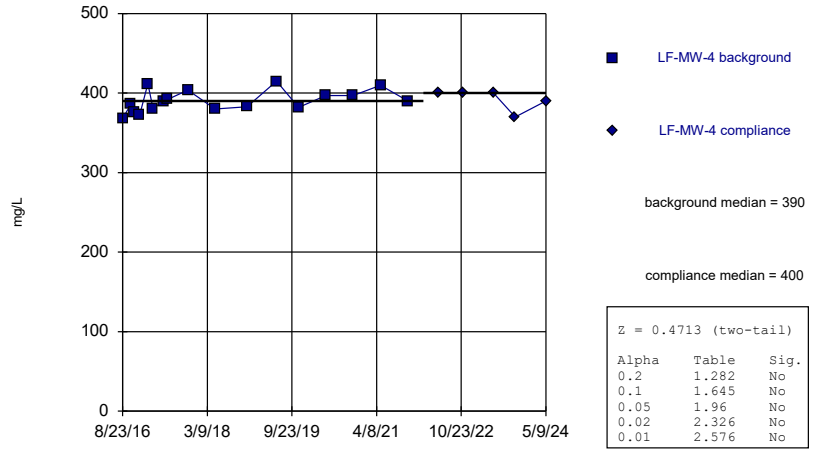
## Mann-Whitney (Wilcoxon Rank Sum)

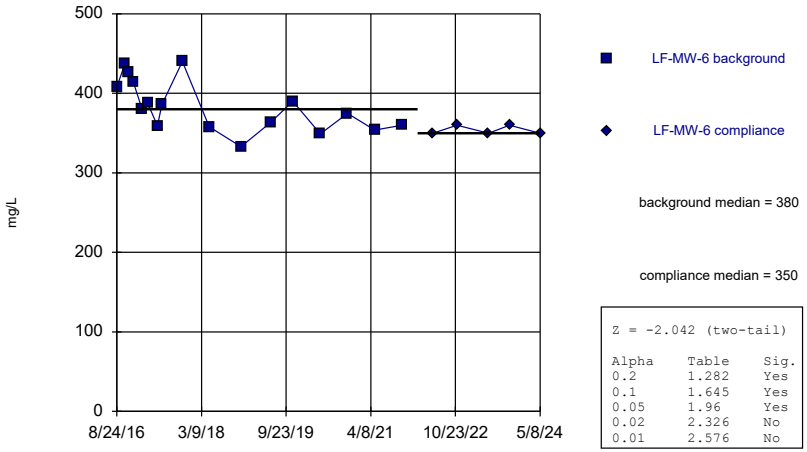
LF-MW-4




Constituent: Total Dissolved Solids Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-6 (bg)




Z = -2.042 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | Yes |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Total Dissolved Solids Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

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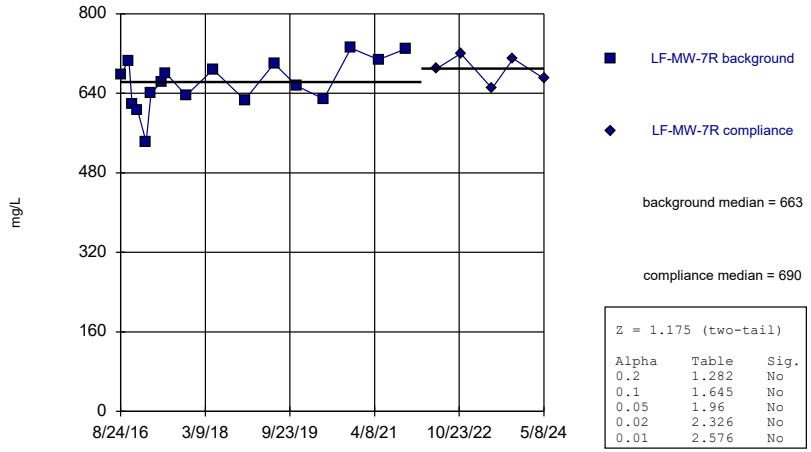
## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-7R (bg)




Z = 1.175 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Total Dissolved Solids Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

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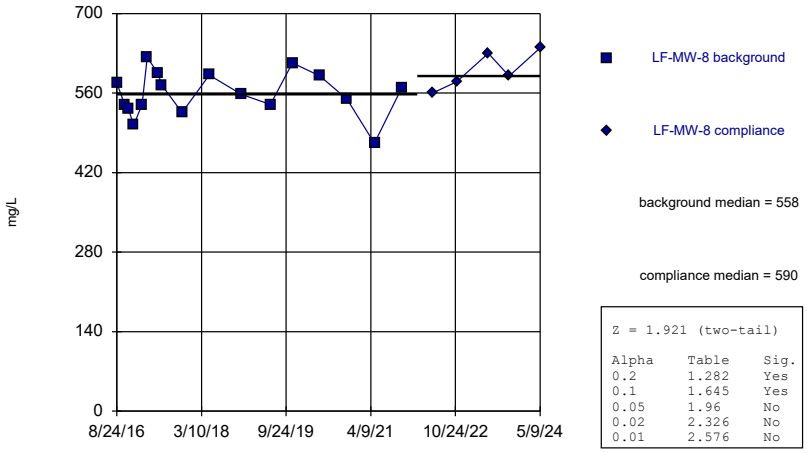
## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-8 (bg)




Z = 1.921 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Total Dissolved Solids Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

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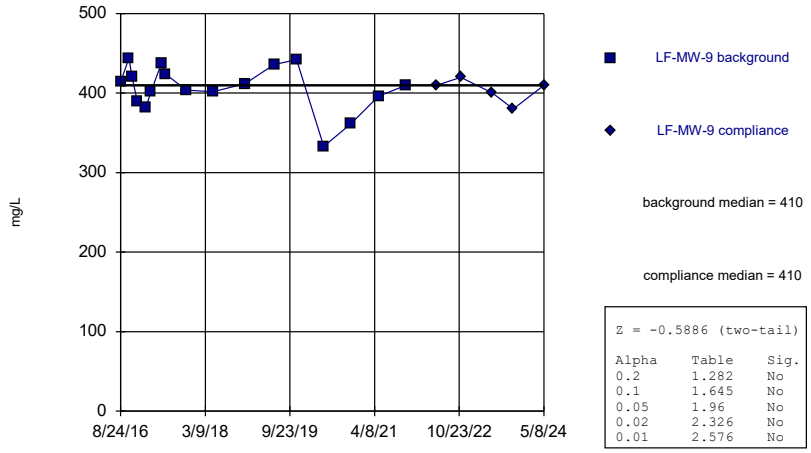
## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-9 (bg)



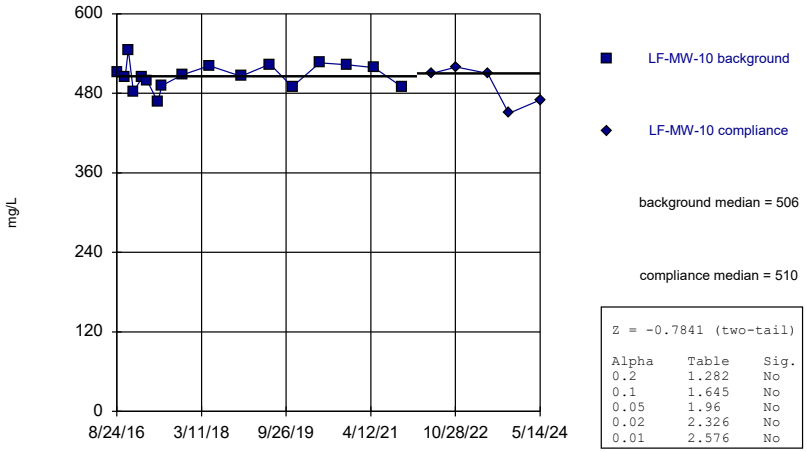

Z = -0.5886 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Total Dissolved Solids Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-10 (bg)




Z = -0.7841 (two-tail)

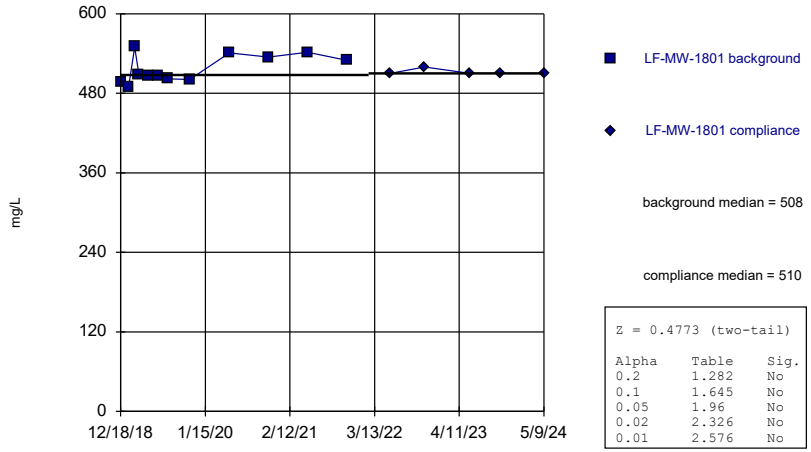
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Total Dissolved Solids Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-1801




Z = 0.4773 (two-tail)

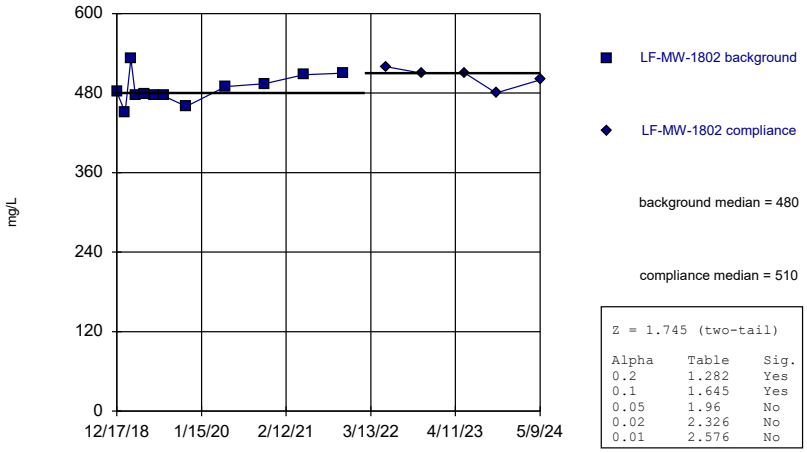
| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | No |
| 0.1 | 1.645 | No |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Total Dissolved Solids Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF



## Mann-Whitney (Wilcoxon Rank Sum)

LF-MW-1802




Z = 1.745 (two-tail)

| Alpha | Table | Sig. |
|---|---|---|
| 0.2 | 1.282 | Yes |
| 0.1 | 1.645 | Yes |
| 0.05 | 1.96 | No |
| 0.02 | 2.326 | No |
| 0.01 | 2.576 | No |

Constituent: Total Dissolved Solids Analysis Run 11/18/2024 2:03 PM View: Mann-Whitney
Amos Landfill Client: Geosyntec Data: Amos LF

FIGURE E

Intrawell PLs

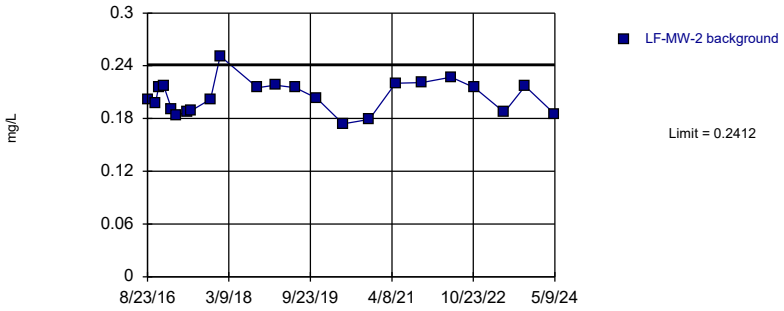
# Appendix III - Intrawell Prediction Limits - All Results

Amos Landfill Client: Geosyntec Data: Amos LF Printed 11/15/2024, 4:23 PM

| Constituent | Well | Upper Lim. | Lower Lim. | Date | Observ. | Sig. | Bg N | Bg Mean | Std. Dev. | %NDs | ND Adj. | Transform | Alpha | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Boron (mg/L) | LF-MW-2 | 0.2412 | n/a | n/a | 1 future | n/a | 23 | 0.2048 | 0.01864 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Boron (mg/L) | LF-MW-4 | 0.2015 | n/a | n/a | 1 future | n/a | 23 | 0.1709 | 0.01568 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Boron (mg/L) | LF-MW-6 | 0.171 | n/a | n/a | 1 future | n/a | 22 | n/a | n/a | 0 | n/a | n/a | 0.003707 | NP Intra (normality) 1 of 2 |
| Boron (mg/L) | LF-MW-7R | 0.1263 | n/a | n/a | 1 future | n/a | 22 | 0.09218 | 0.01739 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Boron (mg/L) | LF-MW-8 | 0.5 | n/a | n/a | 1 future | n/a | 22 | n/a | n/a | 18.18 | n/a | n/a | 0.003707 | NP Intra (normality) 1 of 2 |
| Boron (mg/L) | LF-MW-9 | 0.1332 | n/a | n/a | 1 future | n/a | 22 | -2.79 | 0.3947 | 0 | None | ln(x) | 0.00188 | Param Intra 1 of 2 |
| Boron (mg/L) | LF-MW-10 | 0.194 | n/a | n/a | 1 future | n/a | 22 | -2.391 | 0.3828 | 0 | None | ln(x) | 0.00188 | Param Intra 1 of 2 |
| Boron (mg/L) | LF-MW-1801 | 0.2785 | n/a | n/a | 1 future | n/a | 17 | 0.2448 | 0.01644 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Boron (mg/L) | LF-MW-1802 | 0.2802 | n/a | n/a | 1 future | n/a | 17 | 0.003527 | 0.001286 | 0 | None | x^4 | 0.00188 | Param Intra 1 of 2 |
| Calcium (mg/L) | LF-MW-2 | 2.521 | n/a | n/a | 1 future | n/a | 23 | 0.5906 | 0.1713 | 0 | None | ln(x) | 0.00188 | Param Intra 1 of 2 |
| Calcium (mg/L) | LF-MW-4 | 0.9394 | n/a | n/a | 1 future | n/a | 23 | 0.8143 | 0.0642 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Calcium (mg/L) | LF-MW-6 | 45.83 | n/a | n/a | 1 future | n/a | 22 | 38.65 | 3.657 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Calcium (mg/L) | LF-MW-7R | 44.89 | n/a | n/a | 1 future | n/a | 22 | 34.77 | 5.158 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Calcium (mg/L) | LF-MW-8 | 154.5 | n/a | n/a | 1 future | n/a | 22 | 124.1 | 15.52 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Calcium (mg/L) | LF-MW-9 | 109.3 | n/a | n/a | 1 future | n/a | 22 | 82.84 | 13.51 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Calcium (mg/L) | LF-MW-10 | 2.039 | n/a | n/a | 1 future | n/a | 22 | 1.3 | 0.3765 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Calcium (mg/L) | LF-MW-1801 | 1.827 | n/a | n/a | 1 future | n/a | 17 | 1.569 | 0.1256 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Calcium (mg/L) | LF-MW-1802 | 1.223 | n/a | n/a | 1 future | n/a | 22 | 0.9766 | 0.1255 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Chloride (mg/L) | LF-MW-2 | 5.081 | n/a | n/a | 1 future | n/a | 22 | 3.681 | 0.7136 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Chloride (mg/L) | LF-MW-4 | 29.06 | n/a | n/a | 1 future | n/a | 8 | 24.44 | 1.766 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Chloride (mg/L) | LF-MW-6 | 9.124 | n/a | n/a | 1 future | n/a | 22 | 7.674 | 0.7389 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Chloride (mg/L) | LF-MW-7R | 4.159 | n/a | n/a | 1 future | n/a | 22 | 3.789 | 0.1883 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Chloride (mg/L) | LF-MW-8 | 60.9 | n/a | n/a | 1 future | n/a | 17 | n/a | n/a | 0 | n/a | n/a | 0.005914 | NP Intra (normality) 1 of 2 |
| Chloride (mg/L) | LF-MW-9 | 6.59 | n/a | n/a | 1 future | n/a | 22 | n/a | n/a | 0 | n/a | n/a | 0.003707 | NP Intra (normality) 1 of 2 |
| Chloride (mg/L) | LF-MW-10 | 6.127 | n/a | n/a | 1 future | n/a | 21 | 4.952 | 0.5946 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Chloride (mg/L) | LF-MW-1801 | 16.89 | n/a | n/a | 1 future | n/a | 10 | 14.97 | 0.8097 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Chloride (mg/L) | LF-MW-1802 | 17.2 | n/a | n/a | 1 future | n/a | 9 | n/a | n/a | 0 | n/a | n/a | 0.01809 | NP Intra (normality) 1 of 2 |
| Fluoride (mg/L) | LF-MW-2 | 1.747 | n/a | n/a | 1 future | n/a | 27 | 1.401 | 0.1817 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Fluoride (mg/L) | LF-MW-4 | 1.534 | n/a | n/a | 1 future | n/a | 24 | 1.406 | 0.06619 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Fluoride (mg/L) | LF-MW-6 | 0.281 | n/a | n/a | 1 future | n/a | 22 | 0.2391 | 0.02136 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Fluoride (mg/L) | LF-MW-7R | 0.387 | n/a | n/a | 1 future | n/a | 22 | 0.3073 | 0.04061 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Fluoride (mg/L) | LF-MW-8 | 0.2039 | n/a | n/a | 1 future | n/a | 22 | 0.02562 | 0.008122 | 0 | None | x^2 | 0.00188 | Param Intra 1 of 2 |
| Fluoride (mg/L) | LF-MW-9 | 0.2831 | n/a | n/a | 1 future | n/a | 22 | 0.2132 | 0.03564 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Fluoride (mg/L) | LF-MW-10 | 0.8967 | n/a | n/a | 1 future | n/a | 21 | 0.6038 | 0.1483 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Fluoride (mg/L) | LF-MW-1801 | 5.524 | n/a | n/a | 1 future | n/a | 17 | 5.236 | 0.1404 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Fluoride (mg/L) | LF-MW-1802 | 5.296 | n/a | n/a | 1 future | n/a | 17 | 4.913 | 0.1864 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| pH, field (SU) | LF-MW-2 | 8.915 | 8.288 | n/a | 1 future | n/a | 29 | 8.601 | 0.1661 | 0 | None | No | 0.0009398 | Param Intra 1 of 2 |
| pH, field (SU) | LF-MW-4 | 9.804 | 8.55 | n/a | 1 future | n/a | 27 | 9.177 | 0.329 | 0 | None | No | 0.0009398 | Param Intra 1 of 2 |
| pH, field (SU) | LF-MW-6 | 7.876 | 7.204 | n/a | 1 future | n/a | 22 | 7.54 | 0.1712 | 0 | None | No | 0.0009398 | Param Intra 1 of 2 |
| pH, field (SU) | LF-MW-7R | 7.898 | 7.164 | n/a | 1 future | n/a | 22 | 7.531 | 0.187 | 0 | None | No | 0.0009398 | Param Intra 1 of 2 |
| pH, field (SU) | LF-MW-8 | 7.6 | 6.78 | n/a | 1 future | n/a | 22 | n/a | n/a | 0 | n/a | n/a | 0.007415 | NP Intra (normality) 1 of 2 |
| pH, field (SU) | LF-MW-9 | 7.515 | 6.861 | n/a | 1 future | n/a | 22 | 7.188 | 0.1668 | 0 | None | No | 0.0009398 | Param Intra 1 of 2 |
| pH, field (SU) | LF-MW-10 | 9.6 | 7.972 | n/a | 1 future | n/a | 21 | 8.786 | 0.4122 | 0 | None | No | 0.0009398 | Param Intra 1 of 2 |
| pH, field (SU) | LF-MW-1801 | 9.231 | 8.459 | n/a | 1 future | n/a | 25 | 8.845 | 0.2008 | 0 | None | No | 0.0009398 | Param Intra 1 of 2 |
| pH, field (SU) | LF-MW-1802 | 9.359 | 8.738 | n/a | 1 future | n/a | 23 | 9.049 | 0.1592 | 0 | None | No | 0.0009398 | Param Intra 1 of 2 |
| Sulfate (mg/L) | LF-MW-2 | 11.55 | n/a | n/a | 1 future | n/a | 22 | 8.844 | 1.381 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Sulfate (mg/L) | LF-MW-4 | 11.31 | n/a | n/a | 1 future | n/a | 22 | 9.111 | 1.119 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Sulfate (mg/L) | LF-MW-6 | 55.89 | n/a | n/a | 1 future | n/a | 22 | 5.453 | 1.031 | 0 | None | sqrt(x) | 0.00188 | Param Intra 1 of 2 |
| Sulfate (mg/L) | LF-MW-7R | 252 | n/a | n/a | 1 future | n/a | 22 | 219.2 | 16.7 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Sulfate (mg/L) | LF-MW-8 | 110.2 | n/a | n/a | 1 future | n/a | 21 | 77.5 | 16.55 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Sulfate (mg/L) | LF-MW-9 | 40.93 | n/a | n/a | 1 future | n/a | 22 | 32.58 | 4.256 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Sulfate (mg/L) | LF-MW-10 | 18.73 | n/a | n/a | 1 future | n/a | 22 | 15.47 | 1.661 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Sulfate (mg/L) | LF-MW-1801 | 9.198 | n/a | n/a | 1 future | n/a | 18 | 6.696 | 1.232 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Sulfate (mg/L) | LF-MW-1802 | 36.2 | n/a | n/a | 1 future | n/a | 19 | n/a | n/a | 0 | n/a | n/a | 0.004832 | NP Intra (normality) 1 of 2 |
| Total Dissolved Solids (mg/L) | LF-MW-2 | 394.2 | n/a | n/a | 1 future | n/a | 23 | 367.7 | 13.56 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Total Dissolved Solids (mg/L) | LF-MW-4 | 417.1 | n/a | n/a | 1 future | n/a | 22 | 390.7 | 13.47 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Total Dissolved Solids (mg/L) | LF-MW-6 | 437.4 | n/a | n/a | 1 future | n/a | 22 | 376.9 | 30.85 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Total Dissolved Solids (mg/L) | LF-MW-7R | 758.2 | n/a | n/a | 1 future | n/a | 22 | 667.1 | 46.4 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Total Dissolved Solids (mg/L) | LF-MW-8 | 649.3 | n/a | n/a | 1 future | n/a | 22 | 568 | 41.44 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Total Dissolved Solids (mg/L) | LF-MW-9 | 457.5 | n/a | n/a | 1 future | n/a | 22 | 406 | 26.25 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Total Dissolved Solids (mg/L) | LF-MW-10 | 547.1 | n/a | n/a | 1 future | n/a | 22 | 503.4 | 22.3 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Total Dissolved Solids (mg/L) | LF-MW-1801 | 551.6 | n/a | n/a | 1 future | n/a | 17 | 515.9 | 17.37 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |
| Total Dissolved Solids (mg/L) | LF-MW-1802 | 536.1 | n/a | n/a | 1 future | n/a | 17 | 491.4 | 21.74 | 0 | None | No | 0.00188 | Param Intra 1 of 2 |

## Prediction Limit

Intrawell Parametric, LF-MW-2




Background Data Summary: Mean=0.2048, Std. Dev.=0.01864, n=23. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9421, critical = 0.881. Kappa = 1.95 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Boron Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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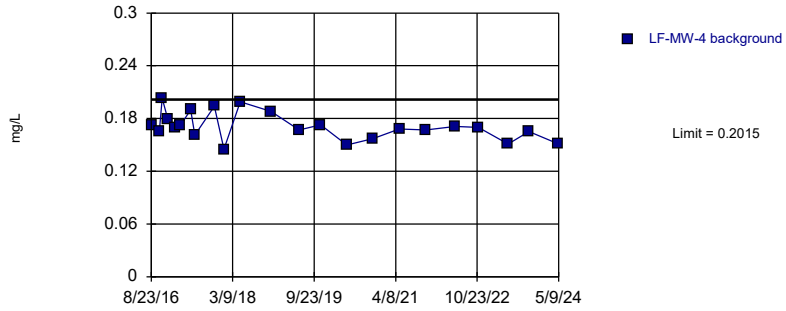
## Prediction Limit

Intrawell Parametric, LF-MW-4




Background Data Summary: Mean=0.1709, Std. Dev.=0.01568, n=23. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9516, critical = 0.881. Kappa = 1.95 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Boron Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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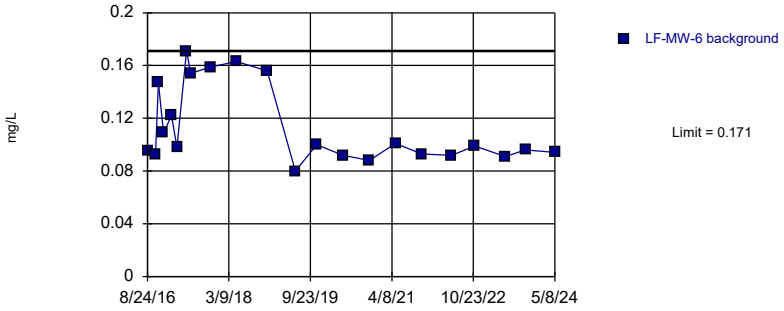
## Prediction Limit

Intrawell Non-parametric, LF-MW-6 (bg)




Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 22 background values. Well-constituent pair annual alpha = 0.007401. Individual comparison alpha = 0.003707 (1 of 2). Assumes 1 future value.

Constituent: Boron Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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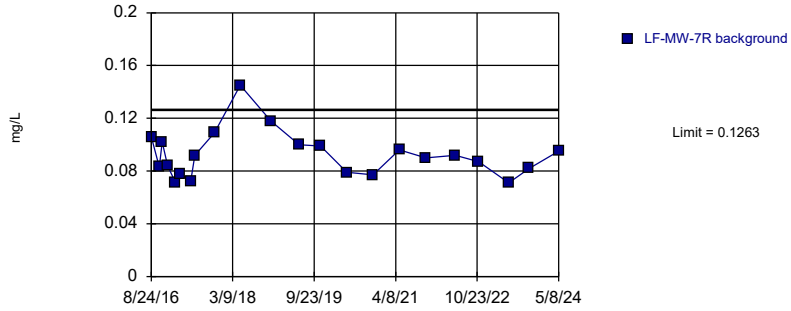
## Prediction Limit

Intrawell Parametric, LF-MW-7R (bg)




Background Data Summary: Mean=0.09218, Std. Dev.=0.01739, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9029, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

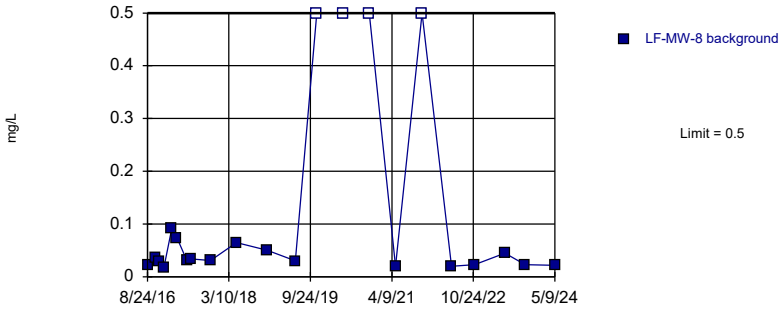
Constituent: Boron Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

Hollow symbols indicate censored values.

## Prediction Limit

Intrawell Non-parametric, LF-MW-8 (bg)




Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 22 background values. 18.18% NDs. Well-constituent pair annual alpha = 0.007401. Individual comparison alpha = 0.003707 (1 of 2). Assumes 1 future value.

Constituent: Boron Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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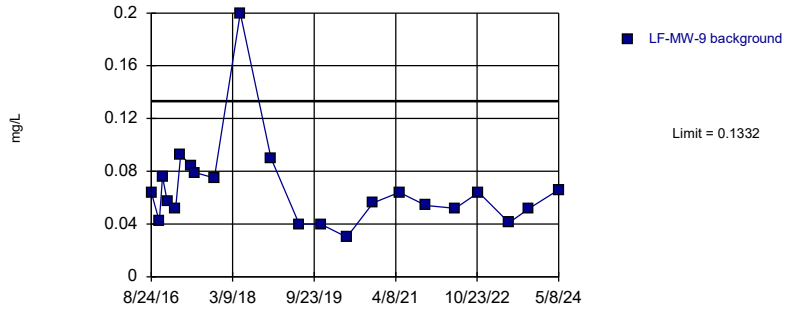
## Prediction Limit

Intrawell Parametric, LF-MW-9 (bg)




Background Data Summary (based on natural log transformation): Mean=-2.79, Std. Dev.=0.3947, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9302, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Boron Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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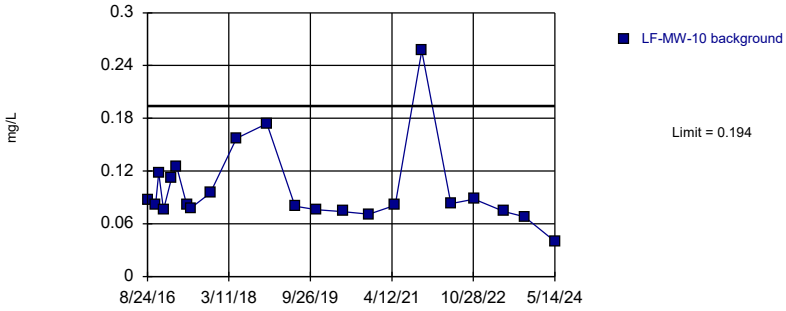
## Prediction Limit

Intrawell Parametric, LF-MW-10 (bg)




Background Data Summary (based on natural log transformation): Mean=-2.391, Std. Dev.=0.3828, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8826, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Boron Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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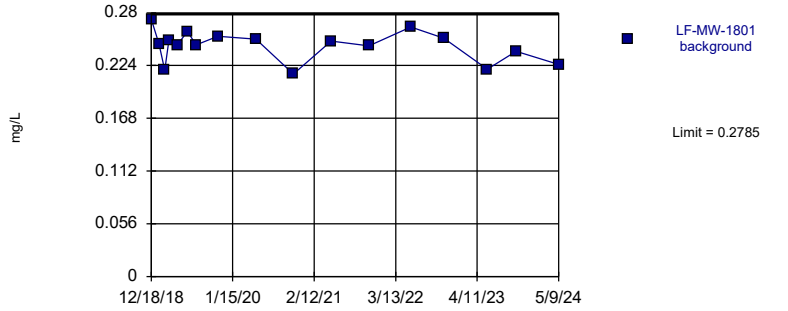
## Prediction Limit

Intrawell Parametric, LF-MW-1801



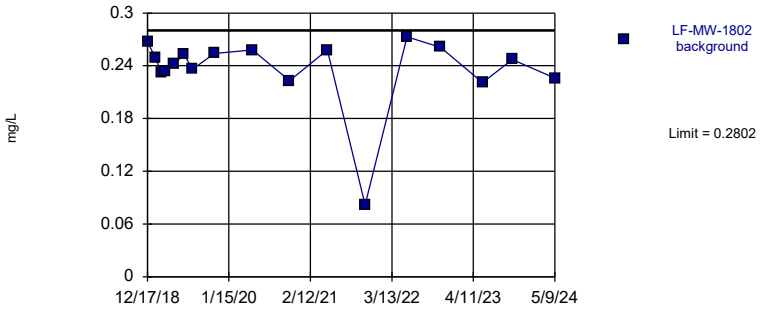

Background Data Summary: Mean=0.2448, Std. Dev.=0.01644, n=17. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9297, critical = 0.892. Kappa = 2.054 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Boron Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

## Prediction Limit

Intrawell Parametric, LF-MW-1802




Background Data Summary (based on x^4 transformation): Mean=0.003527, Std. Dev.=0.001286, n=17. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9354, critical = 0.892. Kappa = 2.054 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

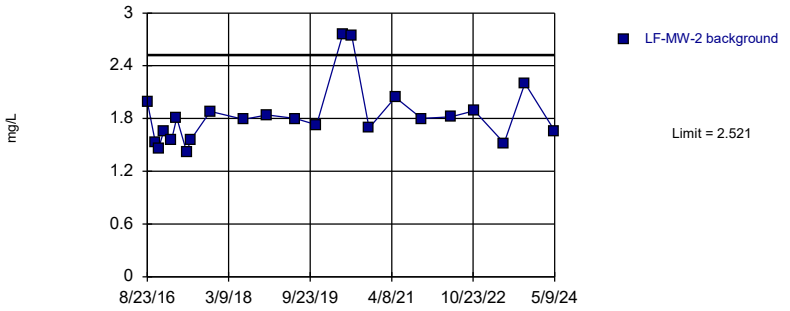
Constituent: Boron Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-2




Background Data Summary (based on natural log transformation): Mean=0.5906, Std. Dev.=0.1713, n=23. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8935, critical = 0.881. Kappa = 1.95 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

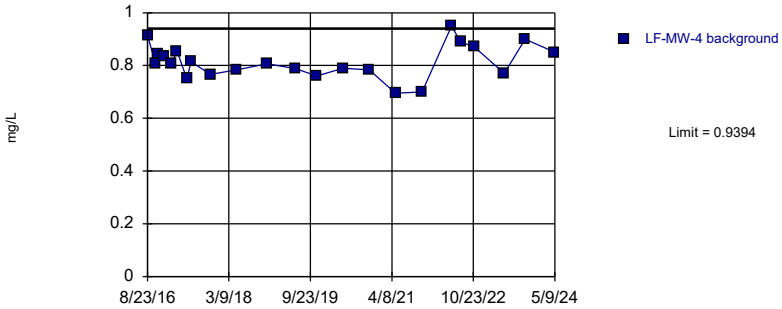
Constituent: Calcium Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-4




Background Data Summary: Mean=0.8143, Std. Dev.=0.0642, n=23. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9792, critical = 0.881. Kappa = 1.95 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

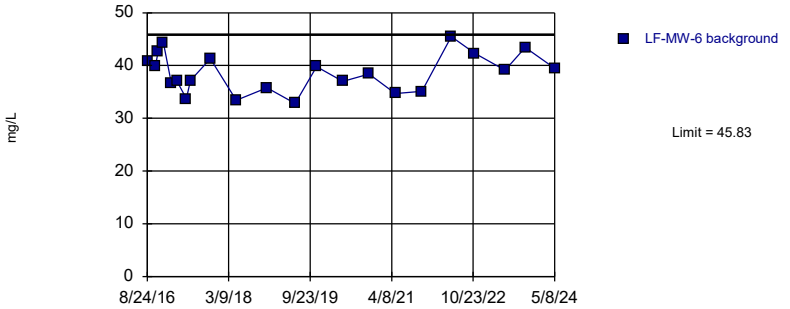
Constituent: Calcium Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-6 (bg)



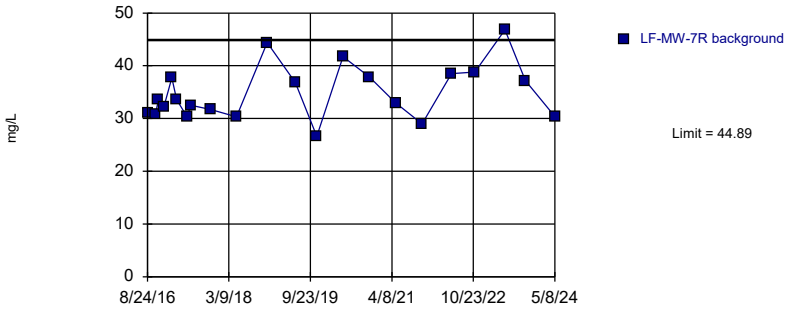

Background Data Summary: Mean=38.65, Std. Dev.=3.657, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9731, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Calcium Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

## Prediction Limit

Intrawell Parametric, LF-MW-7R (bg)




Background Data Summary: Mean=34.77, Std. Dev.=5.158, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9366, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Calcium Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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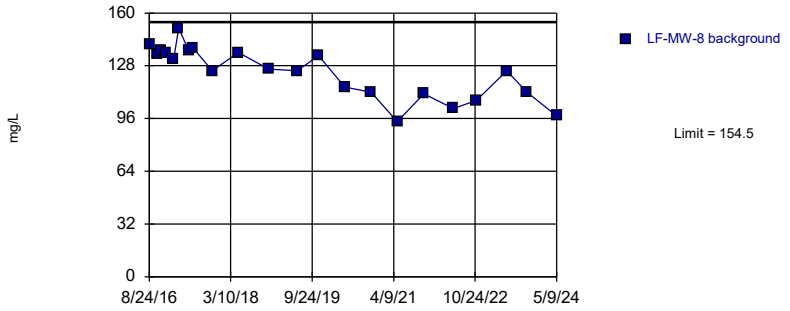
## Prediction Limit

Intrawell Parametric, LF-MW-8 (bg)




Background Data Summary: Mean=124.1, Std. Dev.=15.52, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9435, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Calcium Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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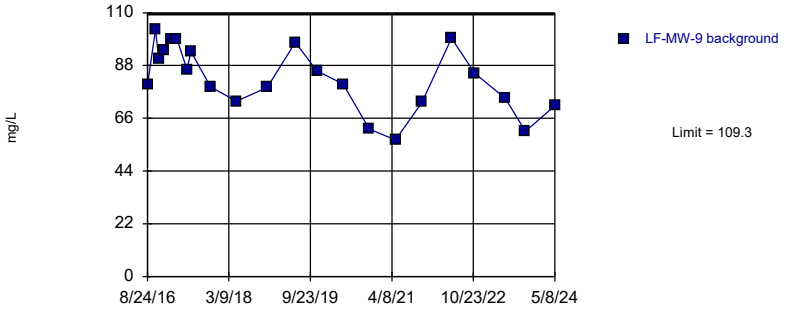
## Prediction Limit

Intrawell Parametric, LF-MW-9 (bg)




Background Data Summary: Mean=82.84, Std. Dev.=13.51, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9526, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Calcium Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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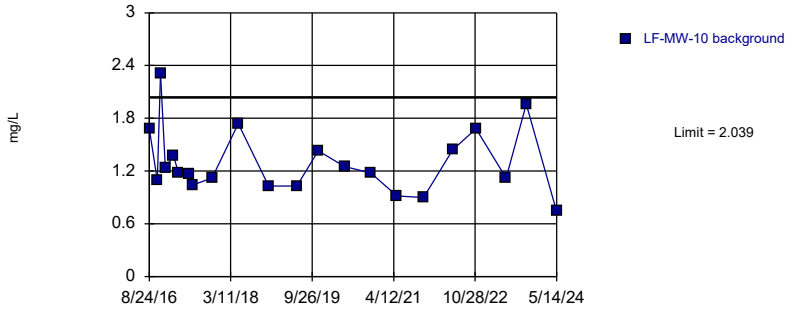
## Prediction Limit

Intrawell Parametric, LF-MW-10 (bg)



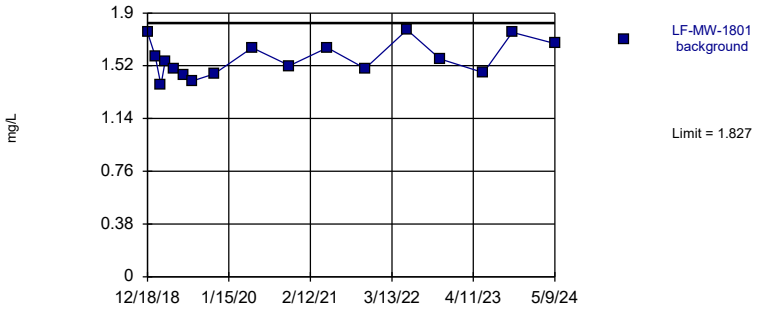

Background Data Summary: Mean=1.3, Std. Dev.=0.3765, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9143, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Calcium Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

## Prediction Limit

Intrawell Parametric, LF-MW-1801




Background Data Summary: Mean=1.569, Std. Dev.=0.1256, n=17. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9437, critical = 0.892. Kappa = 2.054 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Calcium Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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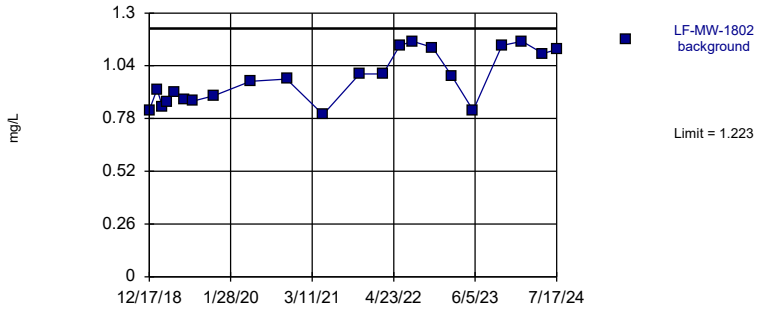
## Prediction Limit

Intrawell Parametric, LF-MW-1802




Background Data Summary: Mean=0.9766, Std. Dev.=0.1255, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9027, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Calcium Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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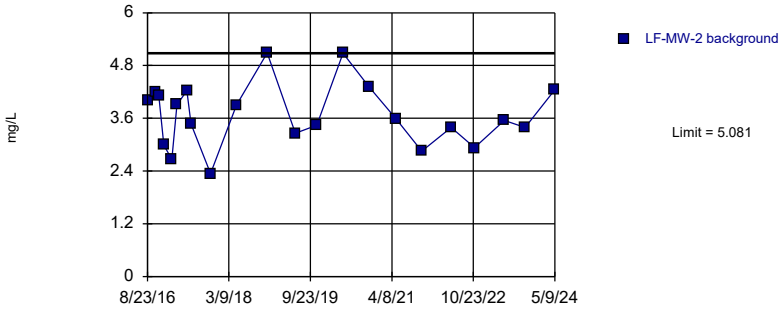
## Prediction Limit

Intrawell Parametric, LF-MW-2




Background Data Summary: Mean=3.681, Std. Dev.=0.7136, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9713, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Chloride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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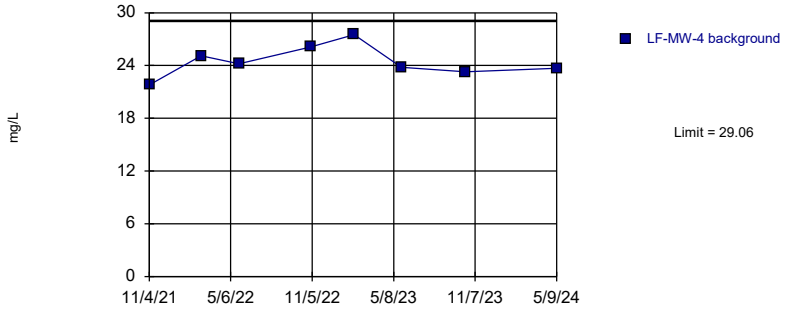
## Prediction Limit

Intrawell Parametric, LF-MW-4



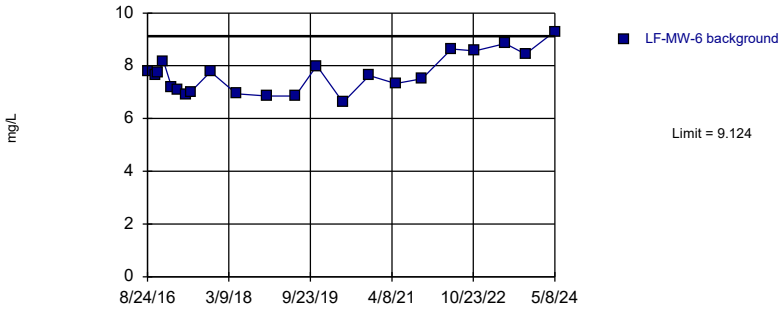

Background Data Summary: Mean=24.44, Std. Dev.=1.766, n=8. Normality test: Shapiro Wilk @alpha = 0.1, calculated = 0.9698, critical = 0.851. Kappa = 2.616 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Chloride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

## Prediction Limit

Intrawell Parametric, LF-MW-6 (bg)




Background Data Summary: Mean=7.674, Std. Dev.=0.7389, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9501, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

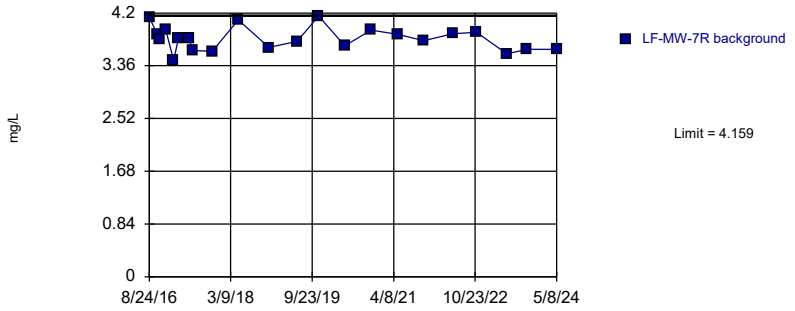
Constituent: Chloride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-7R (bg)




Background Data Summary: Mean=3.789, Std. Dev.=0.1883, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9664, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

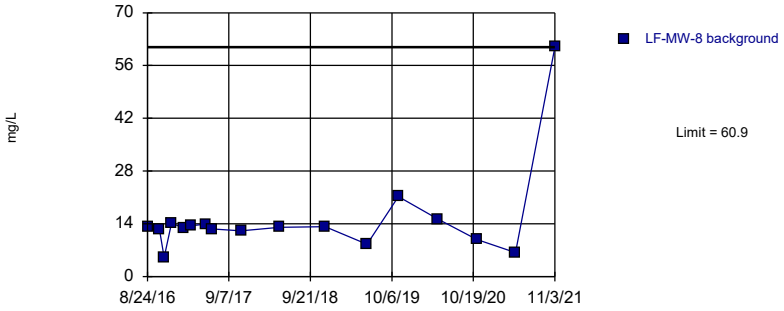
Constituent: Chloride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Non-parametric, LF-MW-8 (bg)




Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 17 background values. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005914 (1 of 2). Assumes 1 future value.

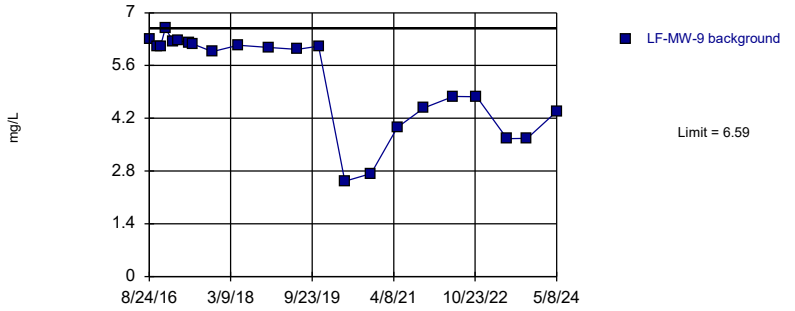
Constituent: Chloride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Non-parametric, LF-MW-9 (bg)



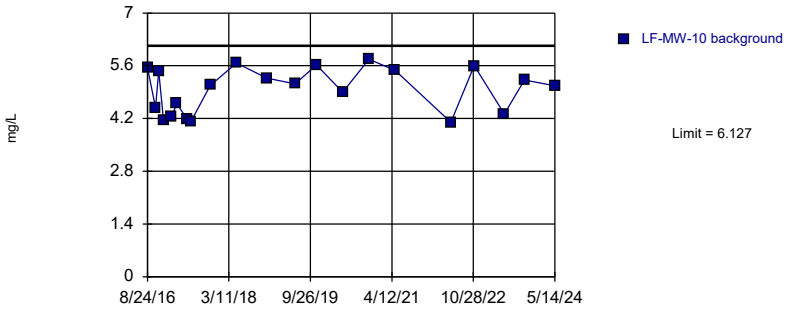

Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 22 background values. Well-constituent pair annual alpha = 0.007401. Individual comparison alpha = 0.003707 (1 of 2). Assumes 1 future value.

Constituent: Chloride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

## Prediction Limit

Intrawell Parametric, LF-MW-10 (bg)




Background Data Summary: Mean=4.952, Std. Dev.=0.5946, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8954, critical = 0.873. Kappa = 1.975 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

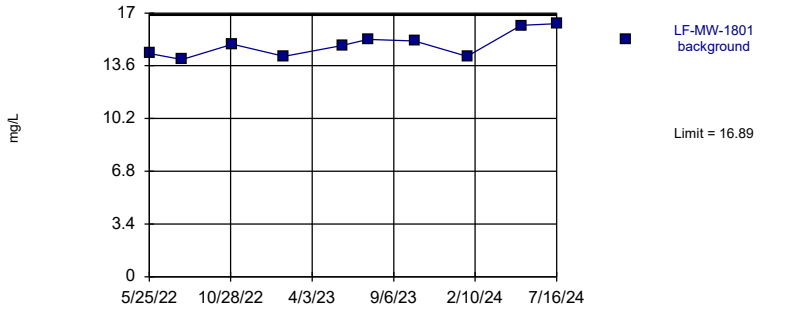
Constituent: Chloride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-1801




Background Data Summary: Mean=14.97, Std. Dev.=0.8097, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9087, critical = 0.842. Kappa = 2.368 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

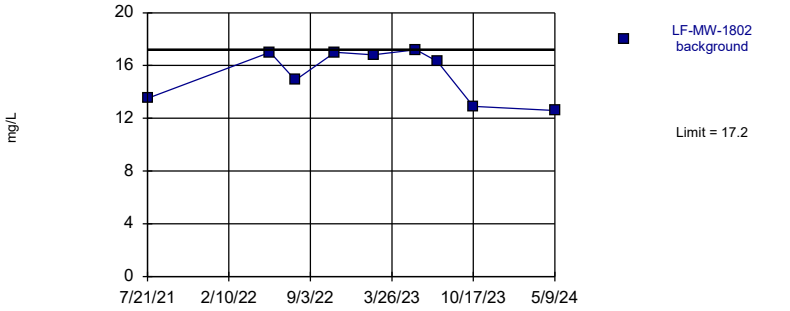
Constituent: Chloride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Non-parametric, LF-MW-1802




Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.1 alpha level. Limit is highest of 9 background values. Well-constituent pair annual alpha = 0.03586. Individual comparison alpha = 0.01809 (1 of 2). Assumes 1 future value.

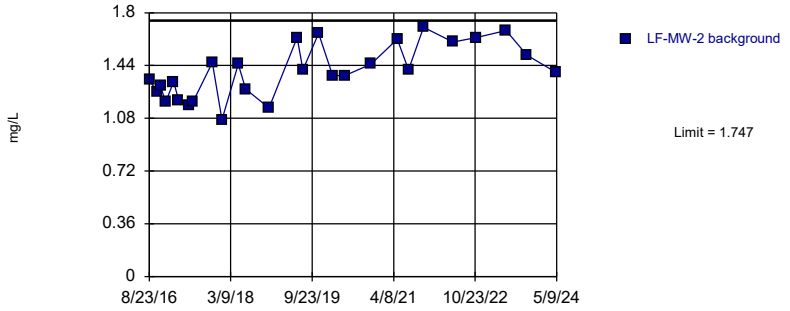
Constituent: Chloride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-2



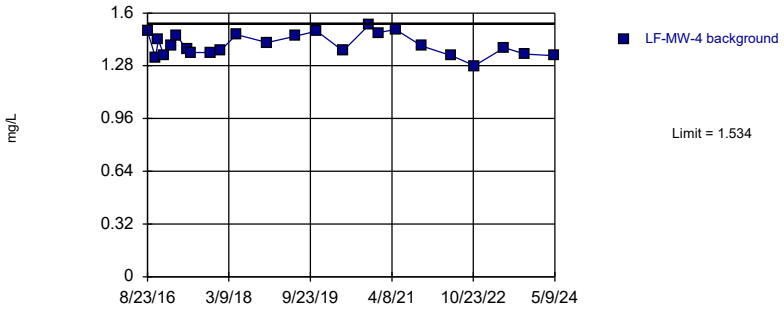

Background Data Summary: Mean=1.401, Std. Dev.=0.1817, n=27. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9534, critical = 0.894. Kappa = 1.906 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Fluoride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

## Prediction Limit

Intrawell Parametric, LF-MW-4




Background Data Summary: Mean=1.406, Std. Dev.=0.06619, n=24. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9545, critical = 0.884. Kappa = 1.937 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

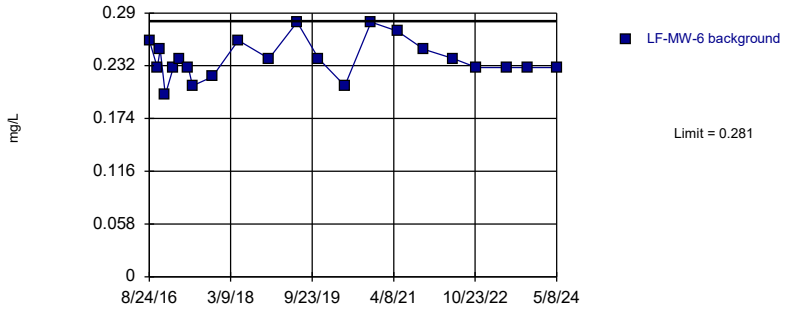
Constituent: Fluoride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-6 (bg)




Background Data Summary: Mean=0.2391, Std. Dev.=0.02136, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9464, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

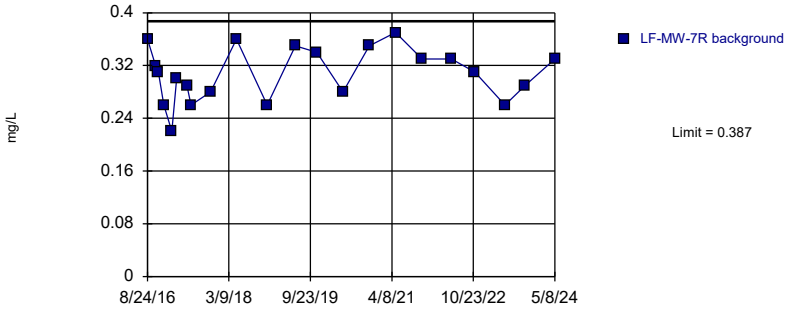
Constituent: Fluoride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-7R (bg)




Background Data Summary: Mean=0.3073, Std. Dev.=0.04061, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9595, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

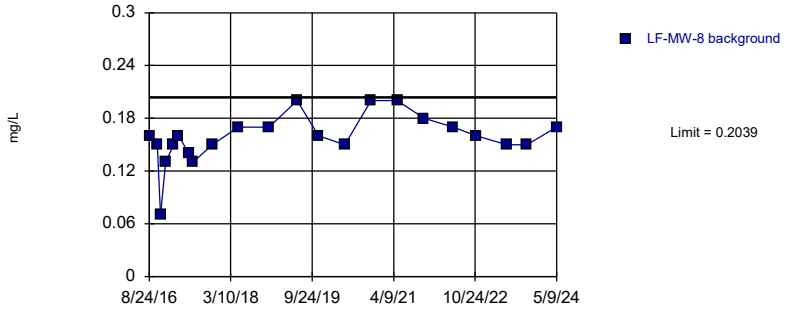
Constituent: Fluoride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-8 (bg)



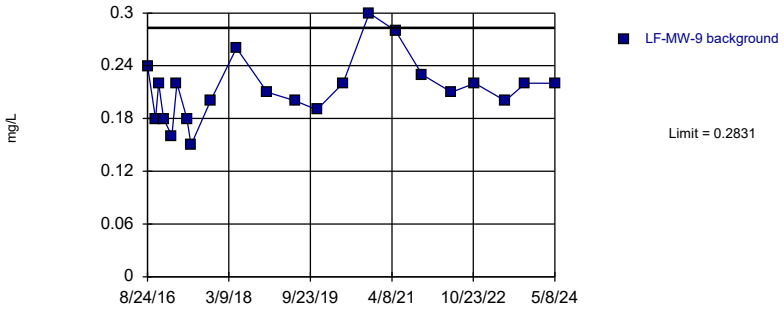

Background Data Summary (based on square transformation): Mean=0.02562, Std. Dev.=0.008122, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9212, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Fluoride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

## Prediction Limit

Intrawell Parametric, LF-MW-9 (bg)




Background Data Summary: Mean=0.2132, Std. Dev.=0.03564, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9477, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

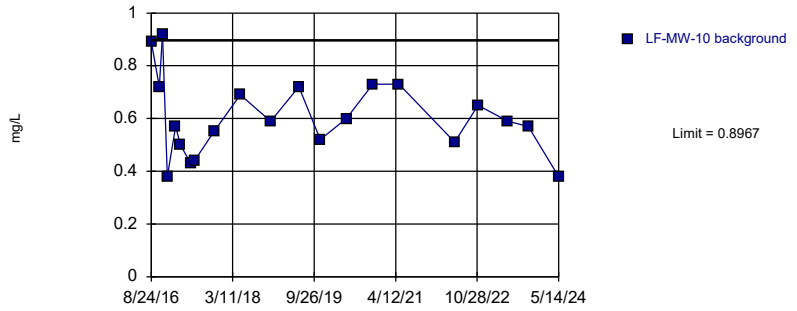
Constituent: Fluoride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-10 (bg)




Background Data Summary: Mean=0.6038, Std. Dev.=0.1483, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9557, critical = 0.873. Kappa = 1.975 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

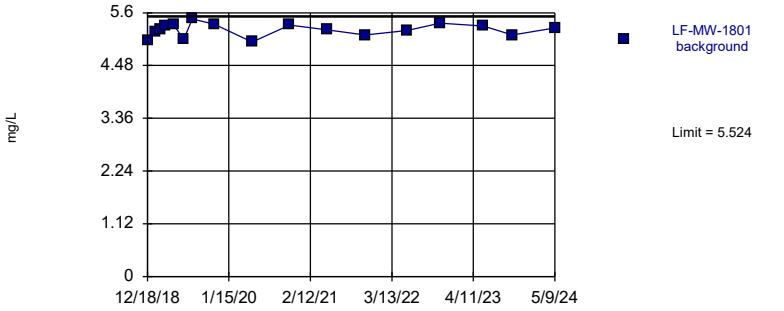
Constituent: Fluoride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-1801




Background Data Summary: Mean=5.236, Std. Dev.=0.1404, n=17. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9499, critical = 0.892. Kappa = 2.054 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

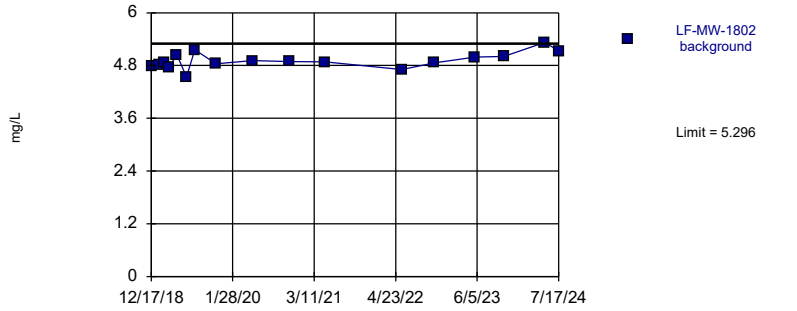
Constituent: Fluoride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-1802



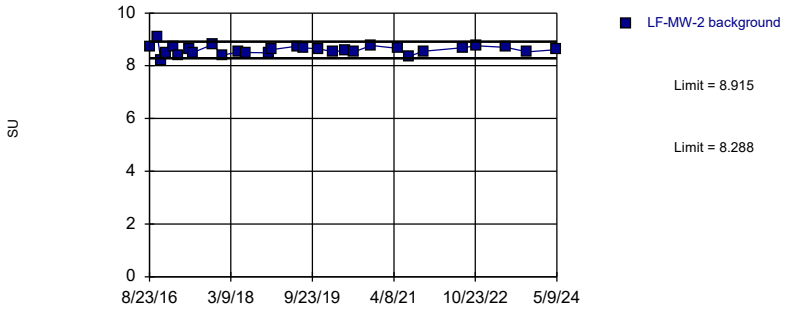

Background Data Summary: Mean=4.913, Std. Dev.=0.1864, n=17. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9745, critical = 0.892. Kappa = 2.054 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Fluoride Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

## Prediction Limit

Intrawell Parametric, LF-MW-2




Background Data Summary: Mean=8.601, Std. Dev.=0.1661, n=29. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9612, critical = 0.898. Kappa = 1.889 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

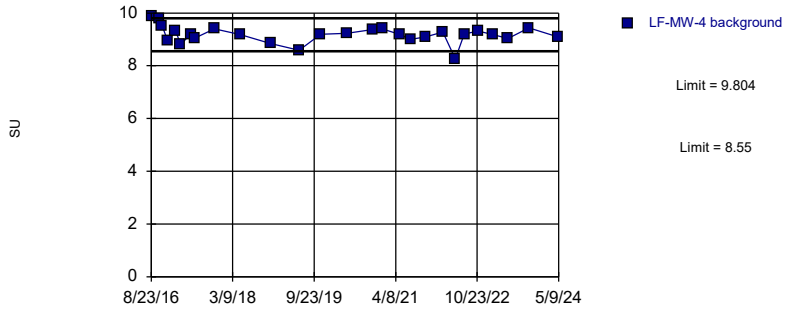
Constituent: pH, field Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-4




Background Data Summary: Mean=9.177, Std. Dev.=0.329, n=27. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9531, critical = 0.894. Kappa = 1.906 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

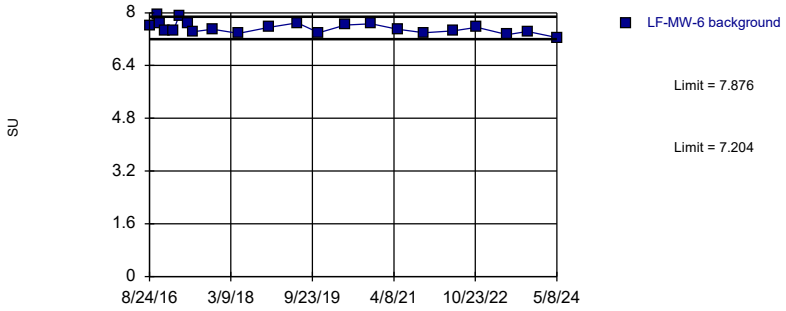
Constituent: pH, field Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-6 (bg)




Background Data Summary: Mean=7.54, Std. Dev.=0.1712, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9466, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

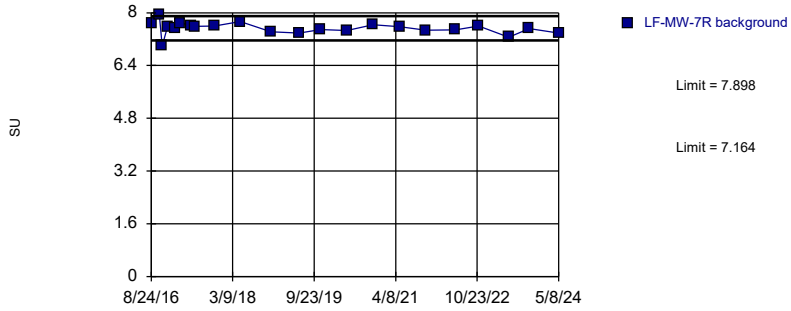
Constituent: pH, field Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-7R (bg)



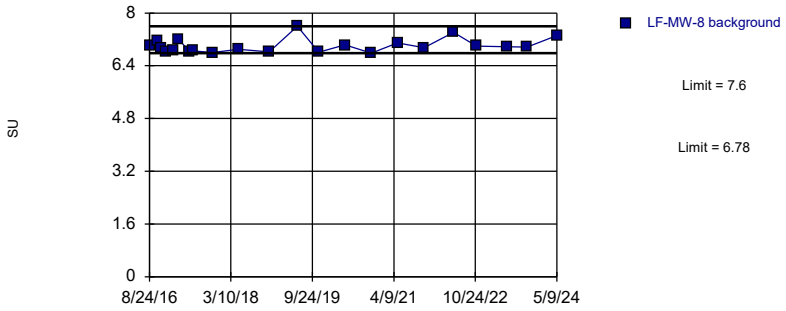

Background Data Summary: Mean=7.531, Std. Dev.=0.187, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9342, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: pH, field Analysis Run 11/15/2024 4:04 PM

Amos Landfill Client: Geosyntec Data: Amos LF

## Prediction Limit

Intrawell Non-parametric, LF-MW-8 (bg)




Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limits are highest and lowest of 22 background values. Well-constituent pair annual alpha = 0.0148. Individual comparison alpha = 0.007415 (1 of 2). Assumes 1 future value.

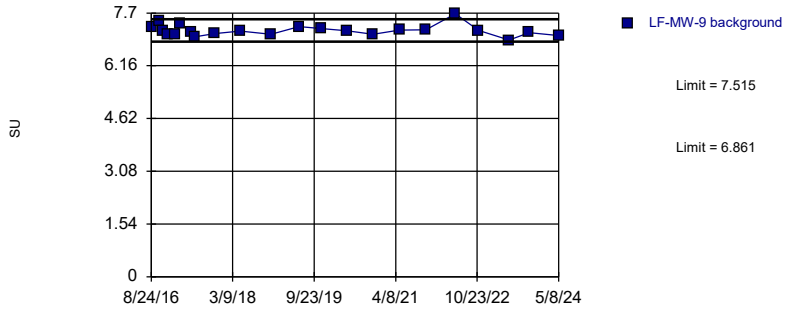
Constituent: pH, field Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-9 (bg)




Background Data Summary: Mean=7.188, Std. Dev.=0.1668, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9154, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

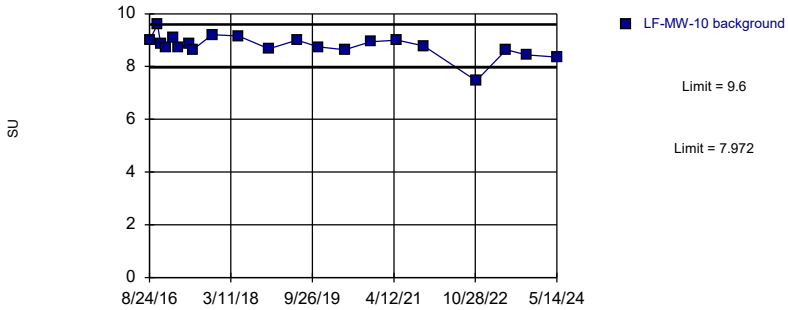
Constituent: pH, field Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-10 (bg)




Background Data Summary: Mean=8.786, Std. Dev.=0.4122, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8763, critical = 0.873. Kappa = 1.975 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

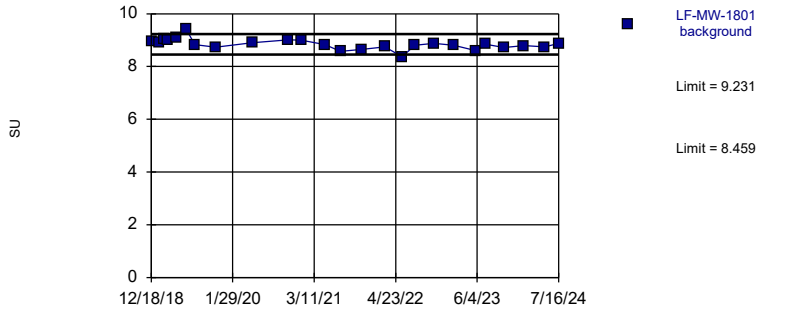
Constituent: pH, field Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-1801



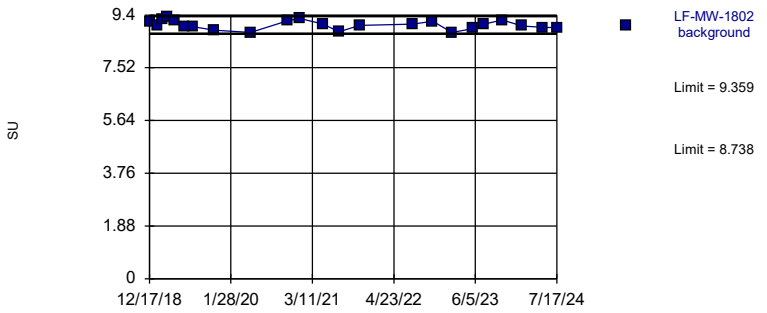

Background Data Summary: Mean=8.845, Std. Dev.=0.2008, n=25. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9619, critical = 0.888. Kappa = 1.924 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: pH, field Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF

## Prediction Limit

Intrawell Parametric, LF-MW-1802




Background Data Summary: Mean=9.049, Std. Dev.=0.1592, n=23. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.965, critical = 0.881. Kappa = 1.95 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

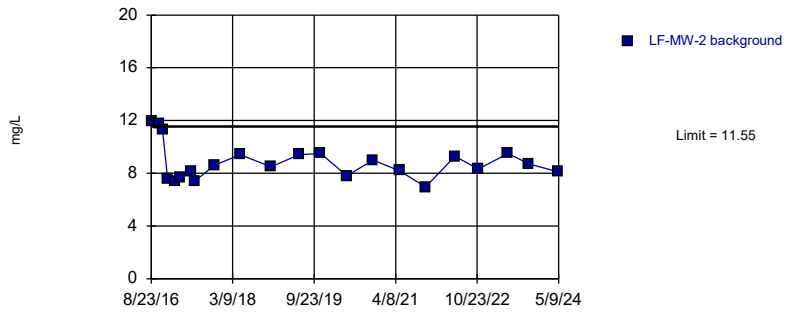
Constituent: pH, field Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-2




Background Data Summary: Mean=8.844, Std. Dev.=1.381, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8903, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

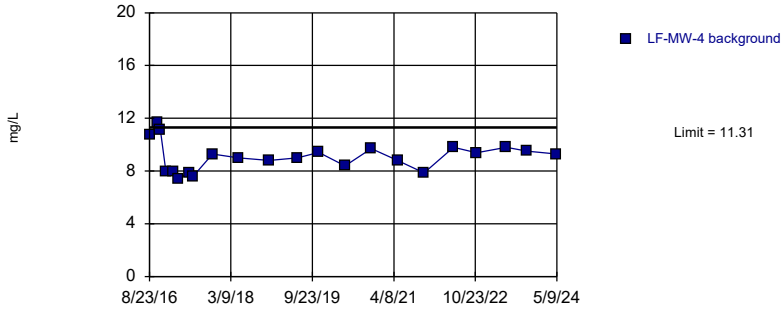
Constituent: Sulfate Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-4




Background Data Summary: Mean=9.111, Std. Dev.=1.119, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9529, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

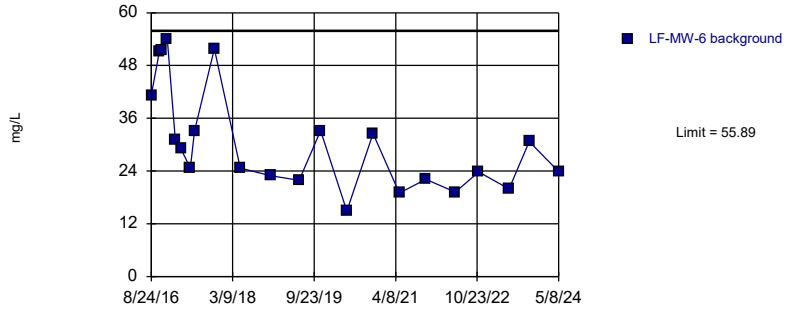
Constituent: Sulfate Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-6 (bg)



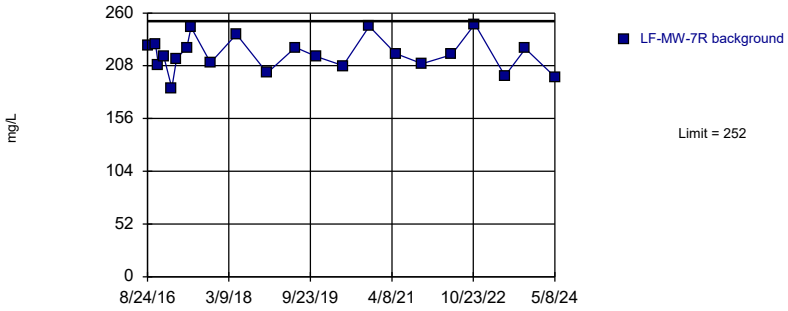

Background Data Summary (based on square root transformation): Mean=5.453, Std. Dev.=1.031, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9088, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Sulfate Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF

## Prediction Limit

Intrawell Parametric, LF-MW-7R (bg)




Background Data Summary: Mean=219.2, Std. Dev.=16.7, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9732, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

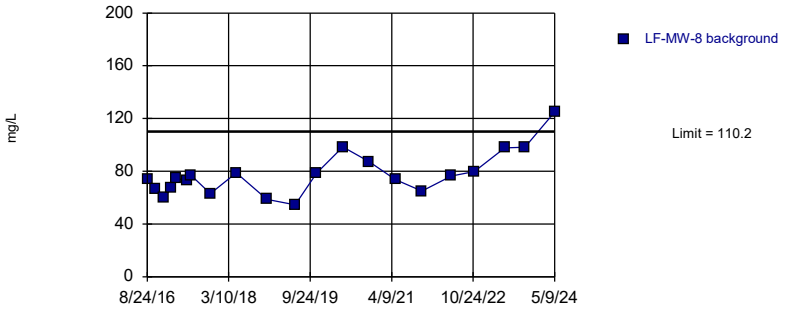
Constituent: Sulfate Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-8 (bg)




Background Data Summary: Mean=77.5, Std. Dev.=16.55, n=21. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9024, critical = 0.873. Kappa = 1.975 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

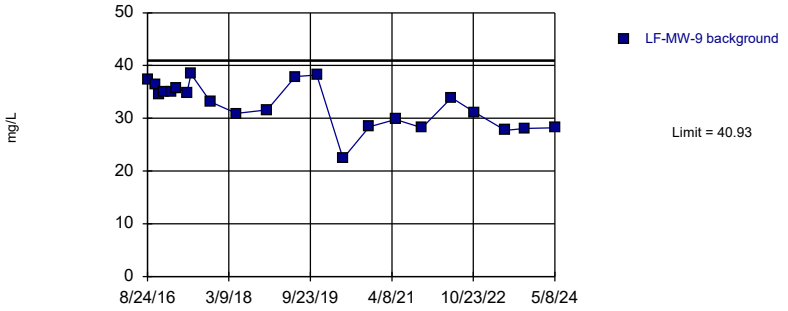
Constituent: Sulfate Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-9 (bg)




Background Data Summary: Mean=32.58, Std. Dev.=4.256, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9426, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

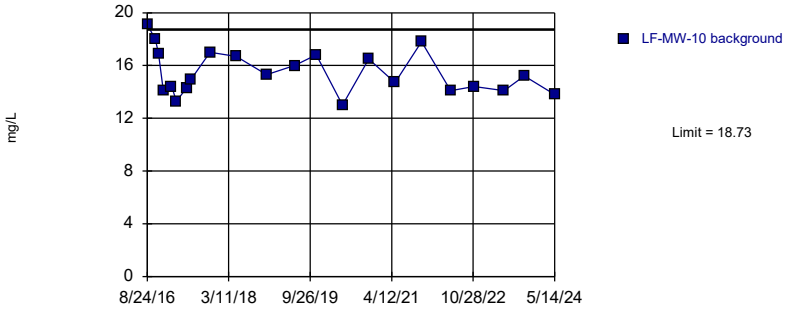
Constituent: Sulfate Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-10 (bg)



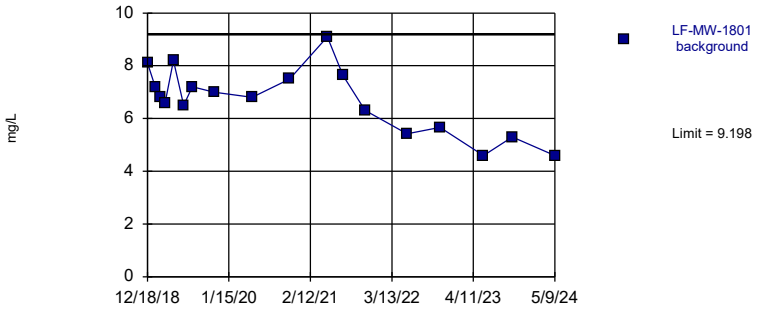

Background Data Summary: Mean=15.47, Std. Dev.=1.661, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9449, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Sulfate Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF

## Prediction Limit

Intrawell Parametric, LF-MW-1801




Background Data Summary: Mean=6.696, Std. Dev.=1.232, n=18. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9732, critical = 0.897. Kappa = 2.032 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

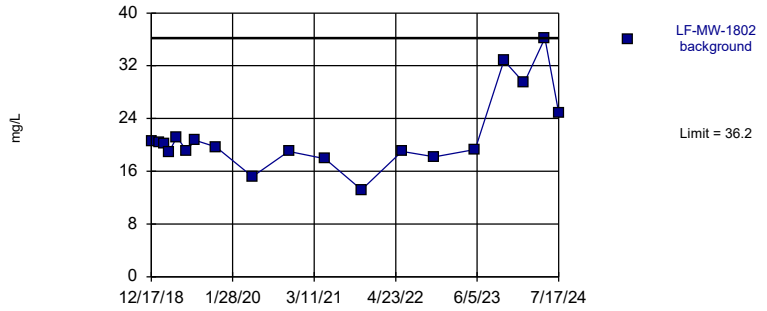
Constituent: Sulfate Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Non-parametric, LF-MW-1802




Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 19 background values. Well-constituent pair annual alpha = 0.009641. Individual comparison alpha = 0.004832 (1 of 2). Assumes 1 future value.

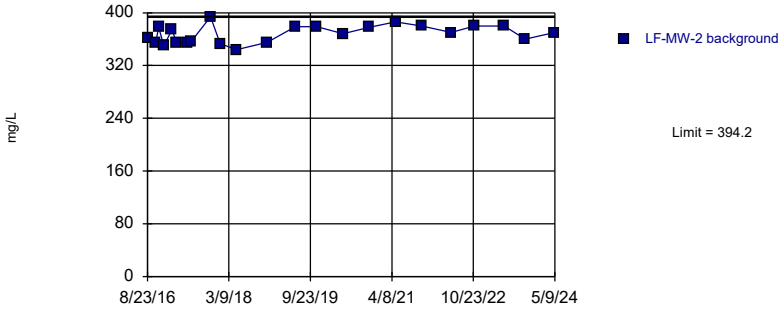
Constituent: Sulfate Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-2




Background Data Summary: Mean=367.7, Std. Dev.=13.56, n=23. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9385, critical = 0.881. Kappa = 1.95 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

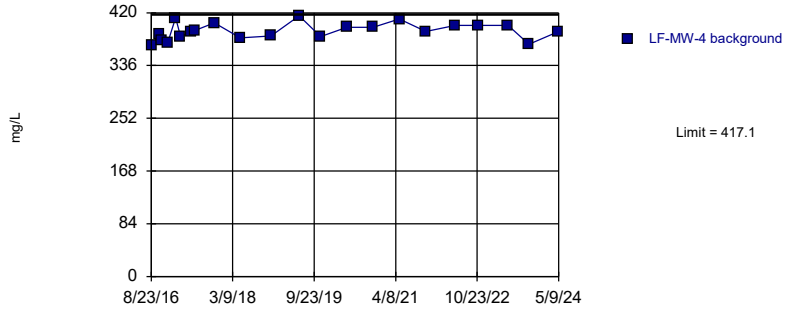
Constituent: Total Dissolved Solids Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF



## Prediction Limit

Intrawell Parametric, LF-MW-4



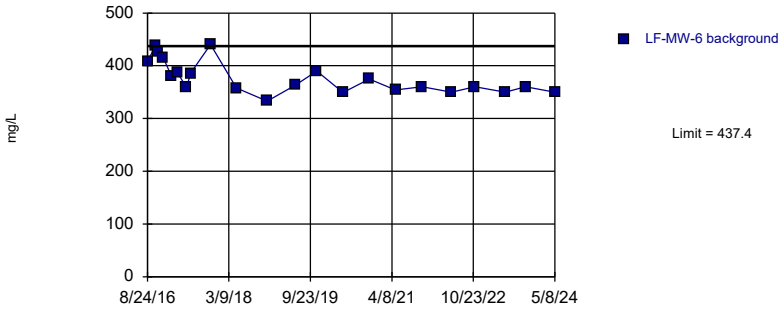

Background Data Summary: Mean=390.7, Std. Dev.=13.47, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9728, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF

## Prediction Limit

Intrawell Parametric, LF-MW-6 (bg)




Background Data Summary: Mean=376.9, Std. Dev.=30.85, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.891, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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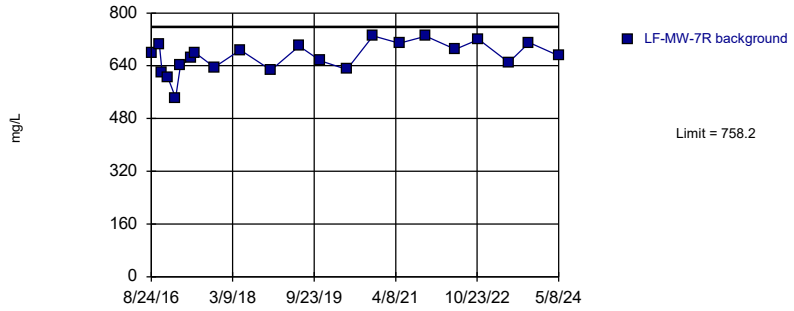
## Prediction Limit

Intrawell Parametric, LF-MW-7R (bg)




Background Data Summary: Mean=667.1, Std. Dev.=46.4, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9478, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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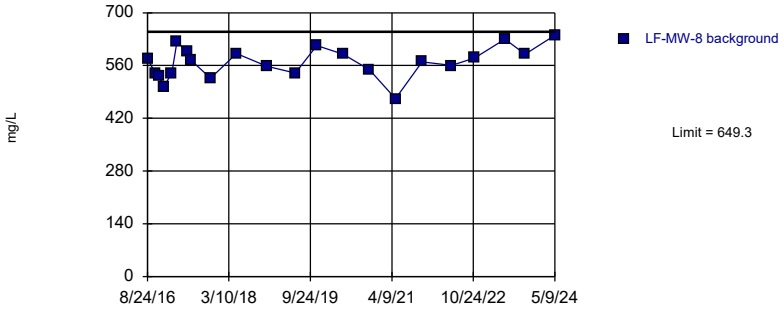
## Prediction Limit

Intrawell Parametric, LF-MW-8 (bg)




Background Data Summary: Mean=568, Std. Dev.=41.44, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9827, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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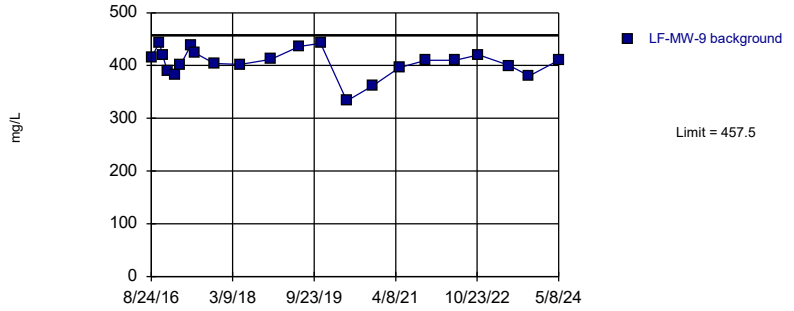
## Prediction Limit

Intrawell Parametric, LF-MW-9 (bg)



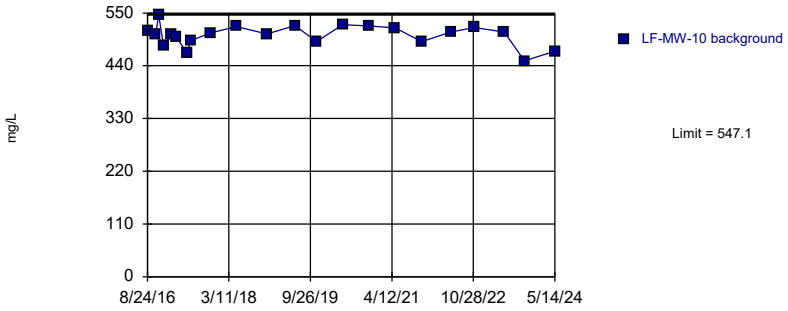

Background Data Summary: Mean=406, Std. Dev.=26.25, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9341, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF

## Prediction Limit

Intrawell Parametric, LF-MW-10 (bg)




Background Data Summary: Mean=503.4, Std. Dev.=22.3, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9599, critical = 0.878. Kappa = 1.962 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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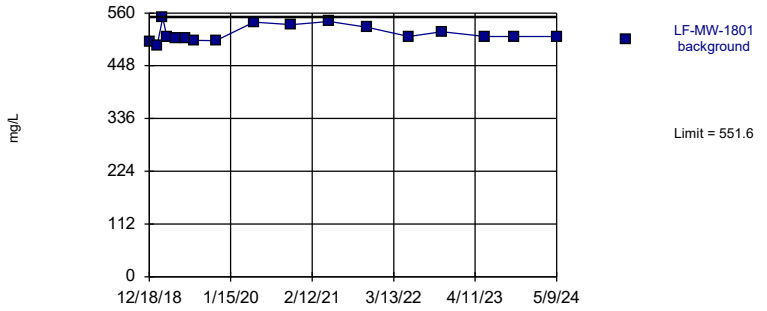
## Prediction Limit

Intrawell Parametric, LF-MW-1801




Background Data Summary: Mean=515.9, Std. Dev.=17.37, n=17. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9056, critical = 0.892. Kappa = 2.054 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

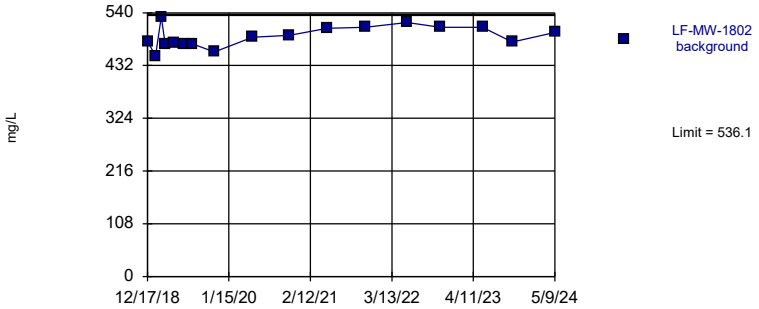
Constituent: Total Dissolved Solids Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF

Sanitas™ v.10.0.23 Software licensed to Groundwater Stats Consulting. UG

## Prediction Limit

Intrawell Parametric, LF-MW-1802




Background Data Summary: Mean=491.4, Std. Dev.=21.74, n=17. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9672, critical = 0.892. Kappa = 2.054 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 11/15/2024 4:05 PM

Amos Landfill Client: Geosyntec Data: Amos LF

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# Memorandum

| | |
|---|---|
| Date: | January 22, 2025 |
| To: | David Miller (AEP) |
| Copies to: | Ben Kepchar (AEP) |
| From: | Allison Kreinberg (Geosyntec) |
| Subject: | Evaluation of Detection Monitoring Data at Amos Plant's Landfill |

In accordance with United States Environmental Protection Agency (USEPA) regulations regarding the disposal of coal combustion residuals (CCR) in landfills and surface impoundments (40 CFR 257 Subpart D, "CCR rule"), the second semiannual detection monitoring event of 2024 at the Landfill, an existing CCR unit at the Amos Power Plant located in Winfield, West Virginia was completed on October 17, 2024.

Background values for the Landfill were originally calculated in January 2018 and are periodically updated as sufficient data becomes available. In May 2020, monitoring wells MW-1 and MW-5 were removed from the groundwater monitoring network and replaced with wells MW-1801 and MW-1802. Following completion of eight background monitoring events, upper prediction limits (UPLs) and lower prediction limits (LPLs) were calculated for MW-1801 and MW-1802. After a minimum of four additional detection monitoring events, the results of those events were compared to the existing background and the data set was updated as appropriate for all wells in the groundwater monitoring network. Revised UPLs were calculated for each Appendix III parameter to represent background values. LPLs were also calculated for pH. Details on the calculation of these revised background values are described in Geosyntec's *Statistical Analysis Summary – Background Update Calculations* report, dated January 21, 2025.

To achieve an acceptably high statistical power while maintaining a site-wide false-positive rate (SWFPR) of 10% per year or less, prediction limits were calculated based on a one-of-two retesting procedure. With this procedure, a statistically significant increase (SSI) is concluded only if both samples in a series of two exceed the UPL (or are below the LPL for pH). In practice, if the initial result did not exceed the UPL, a second sample was not collected or analyzed.

Detection monitoring results and the relevant background values are compared in Table 1. No SSIs were observed at the Amos Landfill CCR unit, and as a result the Amos LF will remain in detection monitoring.

The statistical analysis was conducted within 90 days of completion of sampling and analysis in accordance with 40 CFR 257.93(h)(2). A certification of these statistics by a qualified professional engineer is provided in Attachment A.

**Table 1. Detection Monitoring Data Comparison**
**Detection Summary Memorandum**
**Amos Plant – Landfill**

| Analyte | Unit | Description | MW-2 | MW-4 | MW-1801 | MW-1802 |
|---|---|---|---|---|---|---|
| | | | 10/17/2024 | 10/17/2024 | 10/17/2024 | 10/17/2024 |
| Boron | mg/L | Intrawell Background Value (UPL) | 0.241 | 0.202 | 0.279 | 0.280 |
| | | Analytical Result | 0.226 | 0.153 | 0.252 | 0.247 |
| Calcium | mg/L | Intrawell Background Value (UPL) | 2.52 | 0.939 | 1.83 | 1.22 |
| | | Analytical Result | 2.04 | 0.77 | 1.73 | 0.97 |
| Chloride | mg/L | Intrawell Background Value (UPL) | 5.08 | 29.1 | 16.9 | 17.2 |
| | | Analytical Result | 3.76 | 22.7 | 16.5 | 13.3 |
| Fluoride | mg/L | Intrawell Background Value (UPL) | 1.75 | 1.53 | 5.52 | 5.30 |
| | | Analytical Result | 1.49 | 1.36 | 5.24 | 5.25 |
| pH | SU | Intrawell Background Value (UPL) | 8.9 | 9.8 | 9.2 | 9.4 |
| | | Intrawell Background Value (LPL) | 8.3 | 8.6 | 8.5 | 8.7 |
| | | Analytical Result | 8.4 | 9.2 | 8.6 | 8.9 |
| Sulfate | mg/L | Intrawell Background Value (UPL) | 11.6 | 11.3 | 9.20 | 36.2 |
| | | Analytical Result | 7.3 | 8.6 | 3.7 | 34.2 |
| Total Dissolved Solids | mg/L | Intrawell Background Value (UPL) | 394 | 417 | 552 | 536 |
| | | Analytical Result | 380 | 410 | 530 | 520 |

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

# ATTACHMENT A

## Certification by a Qualified Professional Engineer

**CERTIFICATION BY QUALIFIED PROFESSIONAL ENGINEER**

I certify that the selected statistical method, described above and in the January 21, 2025 *Statistical Analysis Summary* report, is appropriate for evaluating the groundwater monitoring data for the Amos Landfill CCR management area and that the requirements of 40 CFR 257.93(f) have been met.


David Anthony Miller

Printed Name of Licensed Professional Engineer

David Anthony Miller

Signature

| 22663 | West Virginia | 01.24.2025 |
|---|---|---|
| License Number | Licensing State | Date |

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# Memorandum

| | |
|---|---|
| Date: | October 14, 2025 |
| To: | David Miller (AEP) |
| Copies to: | Ben Kepchar (AEP) |
| From: | Allison Kreinberg (Geosyntec) |
| Subject: | Evaluation of Detection Monitoring Data at Amos Plant's Landfill |

In accordance with United States Environmental Protection Agency (USEPA) regulations regarding the disposal of coal combustion residuals (CCR) in landfills and surface impoundments (40 CFR 257 Subpart D, "CCR rule"), the first semiannual detection monitoring event of 2025 at the Landfill, an existing CCR unit at the Amos Power Plant located in Winfield, West Virginia was completed May 13-14, 2025. Based on the results, verification resampling was completed on July 18, 2025.

Background values for the Landfill were originally calculated in January 2018 and are periodically updated as sufficient data becomes available. In May 2020, monitoring wells MW-1 and MW-5 were removed from the groundwater monitoring network and replaced with wells MW-1801 and MW-1802. Following completion of eight background monitoring events, upper prediction limits (UPLs) and lower prediction limits (LPLs) were calculated for MW-1801 and MW-1802. After a minimum of four additional detection monitoring events, the results of those events were compared to the existing background and the data set was updated as appropriate for all wells in the groundwater monitoring network. Revised UPLs were calculated for each Appendix III parameter to represent background values. LPLs were also calculated for pH. Details on the calculation of these revised background values are described in Geosyntec's *Statistical Analysis Summary – Background Update Calculations* report, dated January 21, 2025.

To achieve an acceptably high statistical power while maintaining a site-wide false-positive rate (SWFPR) of 10% per year or less, prediction limits were calculated based on a one-of-two retesting procedure. With this procedure, a statistically significant increase (SSI) is concluded only if both samples in a series of two exceed the UPL (or are below the LPL for pH). In practice, if the initial result did not exceed the UPL, a second sample was not collected or analyzed.

Detection monitoring results and the relevant background values are compared in Table 1 and noted exceedances are described in the list below.

- Chloride concentrations exceeded the intrawell UPL of 16.9 mg/L in both the initial (17.3 mg/L) and second (17.3 mg/L) samples collected at MW-1801. Chloride concentrations exceeded the intrawell UPL of 17.2 mg/L in both the initial (19 mg/L) and second (20.1 mg/L) samples collected at MW-1802. An SSI over background is concluded for chloride at MW-1801 and MW-1802.

The statistical analysis was conducted within 90 days of completion of sampling and analysis in accordance with 40 CFR 257.93(h)(2). A certification of these statistics by a qualified professional engineer is provided in Attachment A.

**Table 1. Detection Monitoring Data Comparison**
**Detection Summary Memorandum**
**Amos Plant – Landfill**

| Analyte | Unit | Description | MW-2 | | MW-4 | MW-1801 | | MW-1802 | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 5/14/2025 | 7/18/2025 | 5/13/2025 | 5/14/2025 | 7/18/2025 | 5/13/2025 | 7/18/2025 |
| Boron | mg/L | Intrawell Background Value (UPL) | 0.241 | | 0.202 | 0.279 | | 0.280 | |
| | | Analytical Result | 0.234 | -- | 0.159 | 0.243 | -- | 0.245 | -- |
| Calcium | mg/L | Intrawell Background Value (UPL) | 2.52 | | 0.939 | 1.83 | | 1.22 | |
| | | Analytical Result | 1.98 | -- | 0.86 | 1.57 | -- | 0.98 | -- |
| Chloride | mg/L | Intrawell Background Value (UPL) | 5.08 | | 29.1 | 16.9 | | 17.2 | |
| | | Analytical Result | 2.47 | -- | 25.7 | **17.3** | **17.3** | **19.0** | **20.1** |
| Fluoride | mg/L | Intrawell Background Value (UPL) | 1.75 | | 1.53 | 5.52 | | 5.30 | |
| | | Analytical Result | **1.89** | 1.62 | 1.47 | 5.39 | -- | 4.95 | -- |
| pH | SU | Intrawell Background Value (UPL) | 8.9 | | 9.8 | 9.2 | | 9.4 | |
| | | Intrawell Background Value (LPL) | 8.3 | | 8.6 | 8.5 | | 8.7 | |
| | | Analytical Result | 8.8 | -- | 9.3 | 8.8 | -- | 8.8 | -- |
| Sulfate | mg/L | Intrawell Background Value (UPL) | 11.6 | | 11.3 | 9.20 | | 36.2 | |
| | | Analytical Result | 10.5 | -- | 11.0 | 4.9 | -- | 20 | -- |
| Total Dissolved Solids | mg/L | Intrawell Background Value (UPL) | 394 | | 417 | 552 | | 536 | |
| | | Analytical Result | 390 | -- | 400 | 540 | -- | 510 | -- |

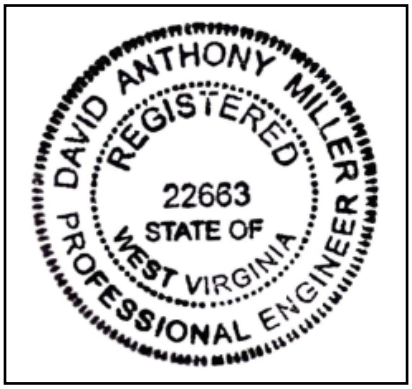
Notes:
**1. Bold values exceed the background value.**
2. Background values are shaded gray.
--: not sampled
LPL: Lower prediction limit
mg/L: milligrams per liter
SU: standard units
UPL: Upper prediction limit

# ATTACHMENT A

## Certification by a Qualified Professional Engineer

## CERTIFICATION BY QUALIFIED PROFESSIONAL ENGINEER

I certify that the selected statistical method, described above and in the January 21, 2025 *Statistical Analysis Summary* report, is appropriate for evaluating the groundwater monitoring data for the Amos Landfill CCR management area and that the requirements of 40 CFR 257.93(f) have been met.




**David Anthony Miller**

Printed Name of Licensed Professional Engineer

Signature

| **22663** | **West Virginia** | **10.15.2025** |
|---|---|---|
| License Number | Licensing State | Date |

## APPENDIX 3

The alternative source demonstrations follow.

Geosyntec consultants

engineers | scientists | innovators

# ALTERNATIVE SOURCE DEMONSTRATION REPORT

# 2024 FIRST SEMIANNUAL EVENT FEDERAL CCR RULE

## Amos Power Plant
## Landfill
## Winfield, West Virginia

*Prepared for*

**American Electric Power**
1 Riverside Plaza
Columbus, Ohio 43215-2372

*Prepared by*

Geosyntec Consultants, Inc.
500 West Wilson Bridge Road, Suite 250
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Project CHA8495

January 2025

Geosyntec consultants

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## LIST OF ATTACHMENTS

Attachment A: MW-1801 and MW-1802 Boring Log and Well Construction Diagrams

Attachment B: Stress-Relief Fracture Conceptual Site Model

Attachment C: Solid Samples Analytical Report

Attachment D: Certification by a Qualified Professional Engineer

## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ASD | alternative source demonstration |
| CCR | coal combustion residuals |
| CFR | Code of Federal Regulations |
| ft/yr | feet per year |
| LPL | lower prediction limit |
| mg/kg | milligrams per kilogram |
| mg/L | milligrams per liter |
| SMCL | secondary maximum contaminant level |
| SSI | statistically significant increase |
| UPL | upper prediction limit |
| USEPA | United States Environmental Protection Agency |
| USGS | United States Geological Survey |

# 1. INTRODUCTION AND SUMMARY

This alternative source demonstration (ASD) report has been prepared to address the statistically significant increases (SSIs) for calcium, chloride, and sulfate at the John E. Amos Plant Landfill (Landfill) following the first semiannual detection monitoring event of 2024.

The previously calculated upper prediction limits (UPLs) for the Landfill were recalculated for each Appendix III parameter to represent background values after four detection monitoring events were completed (Geosyntec 2022). A lower prediction limit (LPL) was also recalculated for pH. The revised prediction limits were calculated based on a one-of-two retesting procedure in accordance with the *Unified Guidance* (United States Environmental Protection Agency [USEPA] 2009a) and the statistical analysis plan developed for the site (Geosyntec 2020). With this procedure, an SSI is concluded only if both samples in a series of two are above the UPL or, in the case of pH, are below the LPL.

The first semiannual detection monitoring event of 2024 was performed in May 2024 (initial sampling event) and July 2024 (verification sampling event), and the results were compared to the prediction limits. During this detection monitoring event, SSIs were identified for chloride at MW-1801 and for calcium and sulfate at MW-1802 based on intrawell comparisons. A summary of the detection monitoring analytical results for all constituents listed in the Code of Federal Regulations (CFR) Title 40, Part 257, Appendix III, and the calculated prediction limits to which they were compared is provided in **Table 1**.

## 1.1 CCR Rule Requirements

In accordance with the USEPA regulations regarding the disposal of coal combustion residuals (CCR) in landfills and surface impoundments, 40 CFR 257.94(e)(2) states the following:

> The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer . . . verifying the accuracy of the information in the report.

Pursuant to 40 CFR 257.94(e)(2), Geosyntec Consultants, Inc. (Geosyntec) has prepared this ASD report to identify whether the SSIs identified for calcium and sulfate at MW-1802 and for chloride at MW-1801 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 identified SSIs could be attributed. Alternative sources are classified into the following five types:

- 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 assess whether the increases in chloride at monitoring well MW-1801 and calcium and sulfate at monitoring well MW-1802 were based on an alternative source and not a release from the Landfill.

# 2. SITE SUMMARY

A brief description of the site geology and hydrology are provided below.

## 2.1 Site Geology Summary

The Landfill site consists of a northern valley and a southern valley, both of which are surrounded on all sides by bedrock ridges (**Figure 1**). A topographic high point separates the two valleys (Arcadis 2020), as shown in **Figure 2**. MW-1802 is a downgradient well in the northern valley, and MW-1801 is a downgradient well in the southern valley. The groundwater flow patterns in the northern and southern valleys are hydrologically separated from each other (**Figure 2**).

Bedrock in the vicinity of MW-1801 and MW-1802 consists of a combination of gray siltstone, silty shale, and red claystone. The boring logs for MW-1801 and MW-1802 identified predominately shale interbedded with sandstone within the screened intervals of both wells (**Attachment A**). These lithologies make up part of the Pennsylvanian Monongahela and Conemaugh Formations, which were deposited by cyclic sequences of limestone, siltstone, sandstone, red and gray shale, and coal (United States Geological Survey [USGS] n.d.).

These formations contain a system of stress-relief fractures that are associated with a regional decline in stress and erosion (Arcadis 2020). Although not represented in boring logs associated with Landfill monitoring well network construction, the sedimentary deposits associated with the Monongahela and Conemaugh Formations contains occasional thin limestone and coal beds. The Pittsburgh Coal and Pittsburgh Limestone beds serve as marker beds indicating the contact between the Monongahela and Conemaugh formations. The Pittsburgh limestone bed has been observed in boring logs at the nearby fly ash pond (Arcadis 2020).

## 2.2 Site Hydrogeology Summary

Groundwater flows through the stress-relief fracture formations, as illustrated in a conceptual site model provided in the *Groundwater Monitoring Network Report* (Arcadis 2020) and included here as **Attachment B**. Bedrock groundwater flow generally follows surface topography, flowing downslope of ridges toward valley floors (Arcadis 2020).

The Landfill monitoring well network, designed and certified by Arcadis (2020), monitors groundwater flow within the Uppermost Aquifer, which was defined by Arcadis (2020) as the saturated portion of the stress-relief fracturing system. This Uppermost Aquifer unit is independent of any single lithologic unit; the stress-relief fracturing system occurs in both the Conemaugh and Monongahela Formations and spans multiple lithologies comprising these formations. According to the *Groundwater Monitoring Network Report*, the stress-relief fracture system "is hydraulically connected from ridges to valleys" (Arcadis 2020), based on a multiple-lines-of-evidence approach discussed in Section 3.2.3 of that report. These multiple lines of evidence include evaluation of boring logs, assessment of groundwater geochemistry, hydraulic testing consisting of borehole packer testing and pump-yield testing, and high-resolution water level monitoring using pressure transducers deployed in monitoring wells across the site.

Water level monitoring data from the May 2024 sampling event were used to calculate groundwater velocities for MW-1801 (2.5 feet per year [ft/yr]) and MW-1802 (3.0 ft/yr). Both high-resolution water level monitoring conducted by Arcadis and seasonal water level monitoring

have not identified seasonal flow-regime changes at or near the Landfill monitoring well network. The current Landfill monitoring well network consists of upgradient monitoring wells MW-6, MW-7R, MW-8, MW-9, and MW-10 and downgradient compliance wells MW-2, MW-4, MW-1801, and MW-1802. Well locations are shown in **Figure 1**. Previous Landfill monitoring network wells MW-1 and MW-5 were removed from the monitoring network after it was determined that groundwater from those locations was representative of shallow perched groundwater zones (Arcadis 2020) and not a part of the Uppermost Aquifer.

# 3. ALTERNATIVE SOURCE DEMONSTRATION

A review of site geochemistry, site historical data, and laboratory quality assurance and quality control data did not demonstrate alternative sources due to Type I (sampling) or Type II (laboratory) causes. A review of the statistical methods used did not identify any Type III (statistical) causes. A review of site geochemistry did not identify any Type V (anthropogenic) causes. As described below, the SSIs for chloride, calcium, and sulfate have been attributed to natural variation, which is a Type IV cause.

## 3.1 Landfill Leachate Data Analysis

The concentrations of boron and major cations and anions known to be indicative of CCR leachate were examined in Landfill leachate samples and compared to monitoring well network groundwater to evaluate whether Landfill leachate influenced downgradient groundwater chemistry. Piper diagrams, which represent the relative proportions of major cations and anions in aqueous samples, were created to visualize aqueous geochemistry for the Landfill leachate and at downgradient wells MW-1801 and MW-1802 (**Figure 3**). The data shown in these Piper diagrams capture the background and detection monitoring periods: 2018 through 2024 for MW-1801 and MW-1802, and 2020 through 2024 for leachate samples.

Groundwater major ion geochemistry at downgradient wells MW-1801 and MW-1802 has remained nearly unchanged throughout the monitoring period, as illustrated by the tight clustering of sample results for each well on the Piper diagrams. Groundwater compositions for both wells are distinct from leachate, particularly for the relative anion percentages circled in blue on the anion distribution triangle in **Figure 3**; leachate samples consist predominantly of sulfate, while groundwater anion compositions are dominated by carbonate alkalinity. These results illustrate stable geochemical composition of site groundwater and a lack of influence from leachate on the groundwater composition. Considering the distinct geochemical composition of the leachate samples, variation in relative percentages of major anions would be expected if downgradient monitoring wells were impacted by Landfill leachate. No such variation is observed in downgradient monitoring well groundwater samples (**Figure 3**).

Boron is typically considered a geochemically conservative parameter due to its minimal attenuation by chemical processes in groundwater flow. Boron therefore functions as an indicator for potential CCR unit releases due to its high relative concentration in CCR materials. Boron concentrations in Landfill leachate samples were 55.2 milligrams per liter (mg/L) and 114 mg/L for the samples collected from the northern valley and southern valley, respectively, in July 2024. Concentrations of boron at downgradient wells MW-1801 and MW-1802, including in May 2024, have consistently been less than 0.3 mg/L (**Figure 4**).

If Landfill leachate, which contains concentrations of boron several orders of magnitude higher than the wells of interest, were impacting groundwater quality at downgradient monitoring wells, an increase in boron concentrations at downgradient wells MW-1801 and MW-1802 would be expected. The recent boron concentrations at the downgradient monitoring wells MW-1801 and MW-1802 do not display increasing trends (**Figure 4**), which indicates that changes in calcium and sulfate in groundwater at MW-1802 and chloride in groundwater at MW-1801 are not due to a release from the Landfill.

## 3.2 Examination of Natural Variability

Calcium, chloride, and sulfate have been found to be common constituents in groundwater from the Pennsylvanian Group in West Virginia (Chambers, et al. 2012), which includes the Monongahela and Conemaugh formations in which MW-1801 and MW-1802 are screened. Long-term groundwater quality, including in the Pennsylvanian Group, was monitored at 300 wells in West Virginia from 1999 to 2008 (Chambers et al. 2012). Samples grouped by geologic age of the aquifer unit indicated that the highest calcium concentration (286 mg/L) and four highest chloride concentrations (i.e., those greater than the secondary maximum contaminant level [SMCL] of 250 mg/L; USEPA 2009b) were measured in Pennsylvanian-aged aquifers. Pennsylvanian-aged aquifer formations were also observed to have the highest reported sulfate value (767 mg/L) as well as the largest degree of variation in sulfate concentrations across the West Virginia aquifer groups.

Bar charts were prepared to compare maximum reported concentrations of calcium (**Figure 5**) and sulfate (**Figure 6**) in upgradient and downgradient wells in the North Valley to the median value of Pennsylvanian-aged aquifers in West Virginia. Calcium and sulfate concentrations at downgradient well MW-1802 were comparable to upgradient well MW-10 and less than upgradient wells MW-8 and MW-9. In Pennsylvanian-aged aquifers across West Virginia, the median calcium value (21 mg/L) observed was nearly 20 times greater than the maximum calcium concentrations in MW-1802 (1.16 mg/L). Although the median sulfate value (7.0 mg/L) in Pennsylvanian-aged aquifers across West Virginia was less than the maximum sulfate concentration observed at MW-1802 (36.2 mg/L; **Figure 6**), Pennsylvanian-aged aquifers in West Virginia were found to contain highly variable sulfate concentrations, with the maximum reported value of 767 mg/L sulfate far exceeding the maximum at MW-1802. Further, sulfate concentrations measured in all North Valley monitoring wells were consistently below the secondary maximum contaminant level of 250 mg/L.

A comparison of maximum reported chloride concentrations in groundwater at upgradient wells MW-6 (9.3 mg/L) and MW-7R (4.15 mg/L) and compliance well MW-1801 (16.3 mg/L) to the median value of Pennsylvanian-aged aquifers in West Virginia (19 mg/L) indicates that chloride concentrations at MW-1801 are similar to or less than chloride concentrations in groundwater measured in the Pennsylvanian aquifers (**Figure 7**). The chloride concentration distribution across Amos LF monitoring wells aligns with regional groundwater trends, as chloride concentrations both upgradient and downgradient of the LF are lower than the median regional value.

MW-1801 and MW-1802 are screened within the Pennsylvanian Monongahela and Conemaugh Formations. These formations represent a cyclic depositional sequence which featured transgressive and regressive periods that caused the deposition of interbedded sequences of limestone, sandstone, shale, and coal (Martin 1998). In such depositional environments, fine grained siltstones and shales are deposited and cyclically exposed to marine waters which are often concentrated in major ions like calcium, chloride, and sulfate.

Transgression-regression cycling creates sequences in which saline marine waters saturate open pore spaces in freshly deposited sediment, which are then retained due to deposition of and burial by additional fine-grained sediment. This process results in trapping of marine water at the time of deposition. While the original water within the pore space is typically replaced by meteoric recharge soon after deposition, a component of the dissolved ions (e.g., calcium, chloride, sulfate)

in the water are typically retained by membrane filtration as an effect of the clay mineralogy of the shale components in these sequences (Drever 1988). In addition to the retention of marine water within the pore space of fine-grained sedimentary rocks, deposited sediment in cyclic marine environments also may become impregnated with soluble evaporitic minerals like halite (crystalline sodium chloride, NaCl) and anhydrite/gypsum (crystalline calcium sulfate, $CaSO_4$), which contain chloride, calcium, and sulfate (Hem 1985). These evaporites are known to be highly soluble and subject to dissolution during pore fluid evolution. Dissolution of these minerals results in further increases to the concentrations of aqueous major ions in pore fluid from rocks of coastal marine origin, regardless of whether these minerals are still present.

Formation water is expected to be diluted by meteoric recharge over time, but depositional and diagenetic processes discussed above would result in some component of major ions being retained in current groundwater at variable concentrations based on site topography, permeability of aquifer sediments, and pore fluid evolution.

The site-specific and regional-scale geochemical observations demonstrate that calcium, chloride, and sulfate concentrations at the downgradient locations are aligned with expected concentrations of these parameters in Pennsylvanian-aged strata within the region, and that observed concentrations at the wells of interest are not anomalous but rather are attributable to natural variations within groundwater as expected based on regional groundwater quality and the depositional environment associated with the screened lithologies of MW-1801 and MW-1802 (**Attachment A**).

## 3.3 Solid Phase Sample Analysis

Aquifer solids samples were collected from geologic core recovered during the installation of monitoring wells MW-1801 and MW-1802 and were submitted for chemical analyses. Based on a review of the boring logs (**Attachment A**), two shale samples and one sandstone sample were collected from each core and analyzed for total chloride, sulfate, and calcium. The laboratory analytical results are provided as **Attachment C** and summarized in **Table 2**. The sandstone sample collected from MW-1801 contained solid-phase chloride concentrations of 24.8 milligrams per kilogram (mg/kg). Calcium concentrations were identified in MW-1802 aquifer solids ranging from 1,120 mg/kg in a shale sample to 3,400 mg/kg in the sandstone sample. Sulfate was detected in all solid samples collected from MW-1802 at concentrations ranging from 8.45 to 17.9 mg/kg.

The depositional environment of these formations would trap a component of major ions within the formation water of these units. The subsequent interaction of groundwater with aquifer solids containing these chemical components will result in additional increases to aqueous concentrations from dissolution and/or ion exchange. Therefore, the presence of some component of major ions (including calcium, chloride, and sulfate) within MW-1801 and MW-1802 groundwater is both expected and unavoidable

Calcium, chloride, and sulfate were detected in aquifer solids from MW-1801 and MW-1802. These laboratory analytical results suggest that the SSIs in MW-1801 and MW-1802 groundwater are associated with natural variability (depositional environment and pore fluid evolution) and not due to a release from the Landfill.

## 3.4 Summary of Findings

A demonstration was conducted to assess whether the SSIs for chloride at MW-1801 and calcium and sulfate at MW-1802 were based on Type IV causes (natural variation) and not due to a release from the Amos Plant Landfill. The following is concluded:

- The SSIs could not be attributed to a Type I (sampling error), Type II (laboratory), Type III (statistical), or Type V (anthropogenic) cause.
- Groundwater chemistry at MW-1801 and MW-1802 is generally stable and does not show evidence of influence from Landfill leachate.
- Concentrations of boron, a primary indicator of CCR impacts to groundwater, at MW-1801 and MW-1802 are very low and do not show increasing trends. If impacts from Landfill leachate, which has elevated levels of boron, to downgradient locations were occurring, increasing boron groundwater concentrations would be expected at MW-1801 and MW-1802.
- Pennsylvanian-aged aquifer data from USGS studies indicate that MW-1802 calcium and sulfate groundwater concentrations and MW-1801 chloride concentrations are lower than or comparable to typical values for wells screened within the same geologic formation across the state. Groundwater from monitoring wells upgradient of the Landfill contains greater concentrations of calcium and sulfate than MW-1802 groundwater, indicating the presence of these parameters in background groundwater at concentrations greater than those observed in compliance well groundwater.
- These parameters are expected to naturally exist in groundwater within these formations due to the depositional environment. Aquifer solid samples collected from MW-1801 and MW-1802 rock cores contain detectable concentrations of calcium, chloride, and sulfate. The geologic material comprising the aquifer unit in which these wells are screened likely contributes to aqueous concentrations via dissolution or ion exchange.

## 3.5 Sampling Requirements

The conclusions of this ASD support the determination that the identified SSIs are from natural variation and not due to a release from the Landfill. Therefore, the unit will remain in the detection monitoring program. Groundwater at the unit will be sampled for Appendix III parameters on a semiannual basis.

# 4. CONCLUSIONS AND RECOMMENDATIONS

The preceding information serves as the ASD prepared in accordance with 40 CFR 257.94(e)(2) and supports the conclusion that the SSIs for calcium and sulfate at MW-1802 and chloride at MW-1801 are attributed to variation of natural groundwater quality (Type IV). Therefore, no further action is warranted, and the Amos Plant Landfill will remain in the detection monitoring program. Certification of this ASD by a qualified professional engineer is provided in **Attachment D**.

# 5. REFERENCES


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USEPA. 2009b. *National Primary Drinking Water Regulations*. United States Environmental Protection Agency. EPA 816-F-09-004. May.

# TABLES

**Table 1. Detection Monitoring Data Comparison**
**Alternative Source Demonstration Report**
**Amos Plant – Landfill**

| Analyte | Unit | Description | MW-2 | MW-4 | MW-1801 | | MW-1802 | |
|---|---|---|---|---|---|---|---|---|
| | | | 5/9/2024 | 5/9/2024 | 5/9/2024 | 7/16/2024 | 5/9/2024 | 7/17/2024 |
| Boron | mg/L | Intrawell Background Value (UPL) | 0.243 | 0.206 | 0.293 | | 0.282 | |
| | | Analytical Result | 0.185 | 0.151 | 0.225 | -- | 0.226 | -- |
| Calcium | mg/L | Intrawell Background Value (UPL) | 3.50 | 0.904 | 1.78 | | 1.05 | |
| | | Analytical Result | 1.66 | 0.85 | 1.68 | -- | **1.10** | **1.12** |
| Chloride | mg/L | Intrawell Background Value (UPL) | 5.32 | 25.1 | 14.0 | | 13.4 | |
| | | Analytical Result | 4.25 | 23.7 | **16.2** | **16.3** | 12.6 | -- |
| Fluoride | mg/L | Intrawell Background Value (UPL) | 1.74 | 1.55 | 5.58 | | 5.32 | |
| | | Analytical Result | 1.39 | 1.34 | 5.28 | -- | **5.33** | 5.13 |
| pH | SU | Intrawell Background Value (UPL) | 8.9 | 9.8 | 9.3 | | 9.4 | |
| | | Intrawell Background Value (LPL) | 8.2 | 8.6 | 8.5 | | 8.7 | |
| | | Analytical Result | 8.6 | 9.1 | 8.7 | -- | 9.0 | -- |
| Sulfate | mg/L | Intrawell Background Value (UPL) | 12.1 | 11.5 | 9.05 | | 24.2 | |
| | | Analytical Result | 8.1 | 9.3 | 4.6 | -- | **36.2** | **24.9** |
| Total Dissolved Solids | mg/L | Intrawell Background Value (UPL) | 396 | 419 | 563 | | 527 | |
| | | Analytical Result | 370 | 390 | 510 | -- | 500 | -- |

Notes:
**1. Bold values exceed the background value.**
2. Background values are shaded gray.
--: not sampled
LPL: lower prediction limit
mg/L: milligrams per liter
SU: standard units
UPL: upper prediction limit

**Table 2. Key Solid Sample Analytical Results**
**Alternative Source Demonstration Report**
**Amos Plant – Landfill**

| Sample Location | Identified SSI | Lithology | Depth (feet) | Parameter | | |
|---|---|---|---|---|---|---|
| | | | | Calcium | Chloride | Sulfate |
| MW-1801 | Chloride | Shale | 55.9-56.6 | 1010 | <10.4 | 9.59 J |
| | | Shale | 58.0-58.8 | 2910 | <10.5 | 16.6 |
| | | Sandstone | 59.8-60.5 | 25600 | 24.8 | 20.0 |
| MW-1802 | Calcium, Sulfate | Shale | 51.9-52.5 | 1120 | <10.5 | 17.9 |
| | | Shale | 55.3-55.8 | 1230 | <10.4 | 14.6 |
| | | Sandstone | 56.3-56.9 | 3400 | <9.87 | 8.45 J |

**Notes:**
1. All results are shown in units of milligrams per kilogram.
2. Non-detects are shown as less than (<) the reporting limit.

SSI: Statistically significant increase(s)
J: Result is less than the reporting limit but greater than or equal to the method detection limit and the concentrations is an approximate value.

# FIGURES


**Legend**

- Upgradient Sampling Location
- Downgradient Sampling Location
- FGD Landfill Permitted Limits
- Northern Valley
- Southern Valley

**Notes**

- Monitoring well coordinates provided by AEP.
- Aerial imagery provided by ESRI and dated 12/07/2023.

700 350 0 700 Feet

**Site Layout**
**FGD Landfill**

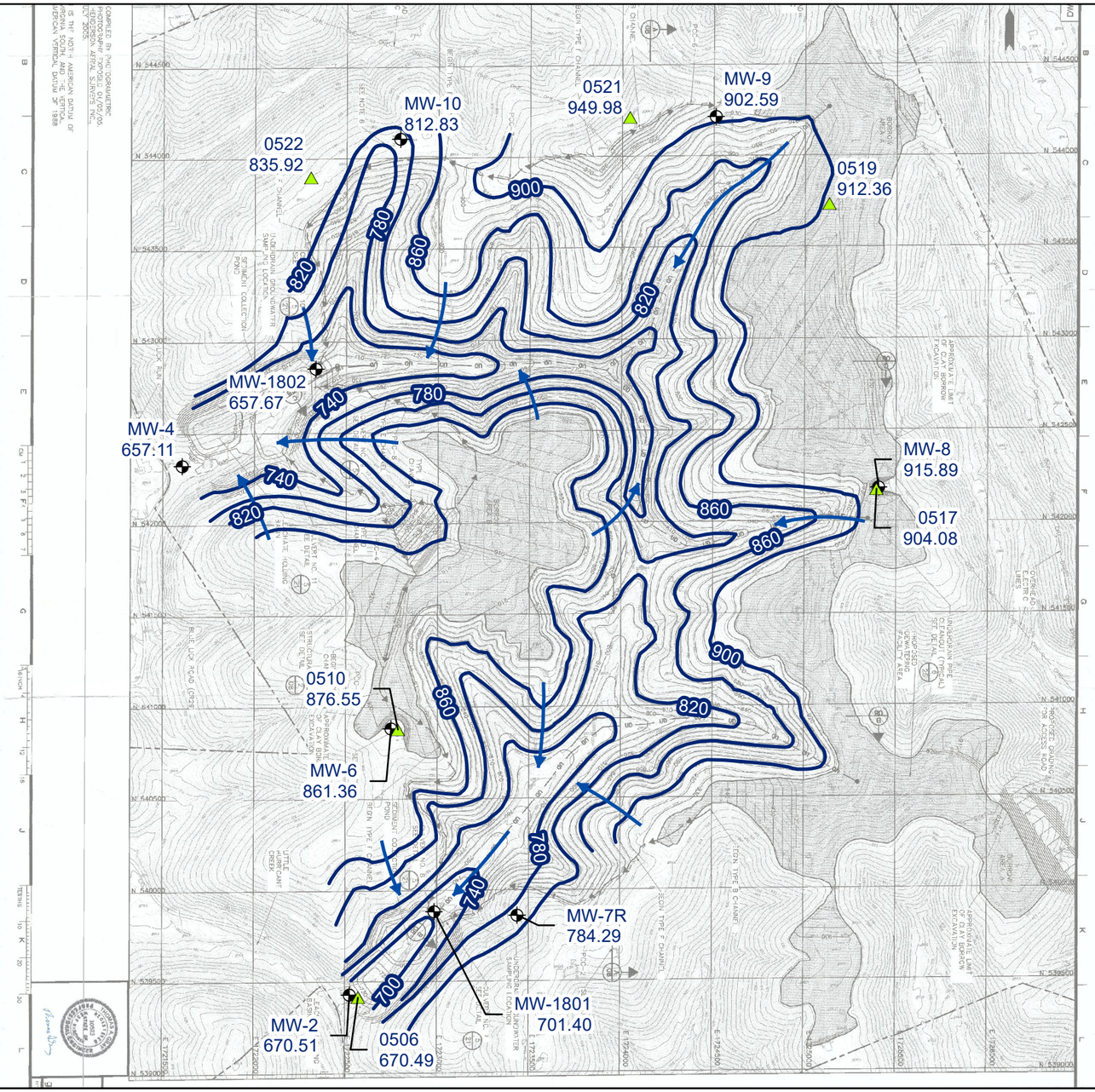
AEP Amos Generating Plant
Winfield, West Virginia

Geosyntec consultants

Columbus, Ohio | January 2025

Figure **1**

\\annarbor-01\Data\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Amos\AEP-Amos_Landfill_Site_Layout.mxd. ASoltero. 12/15/2023. CHA8423/04/08.




**Legend**

- Groundwater Monitoring Well
- Piezometer
- Groundwater Elevation Contour
- Groundwater Flow Direction

**Notes**

1. Monitoring well coordinates and water level data (collected on July 16, 2024) provided by AEP.
2. As of 2023, a portion of the liner in Cell 4 was replaced with a riprap drainage blanket; re-lining construction is ongoing.
3. Topography and drainage system basemap from AEP Drawing No. 13-30500-05-A (topographic contour interval: 10 feet).
4. Groundwater elevation units are feet above mean sea level (ft amsl).

1,000 500 0 1,000 Feet

**Potentiometric Surface Map - Uppermost Aquifer**
**July 2024**

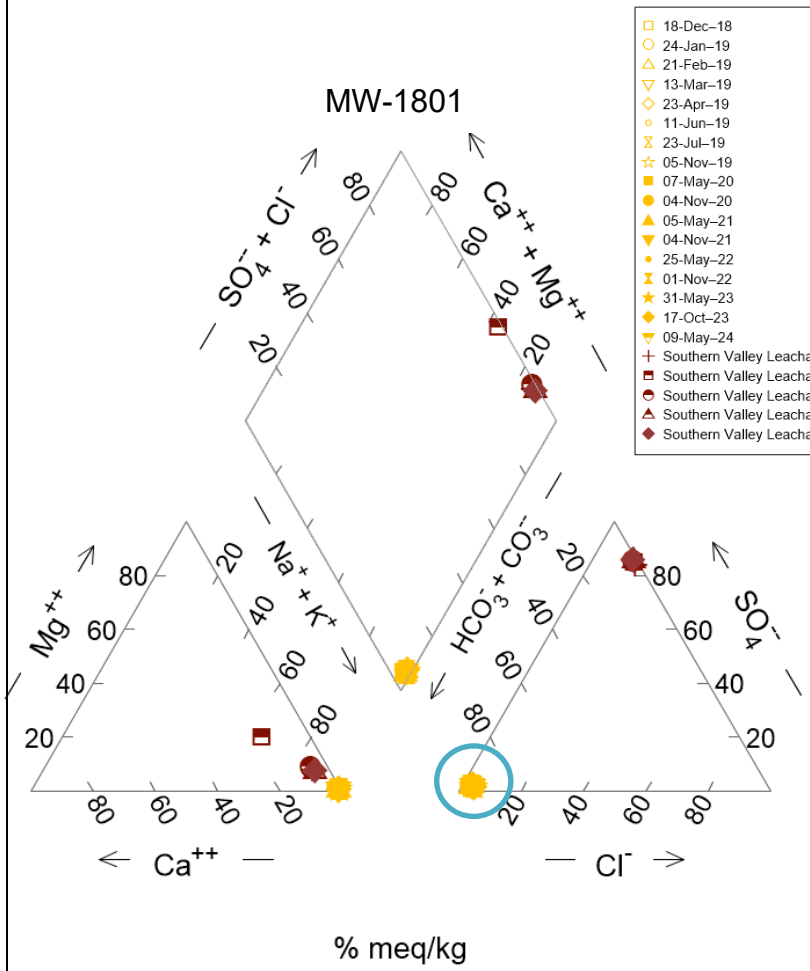
AEP Amos Generating Plant
Winfield, West Virginia

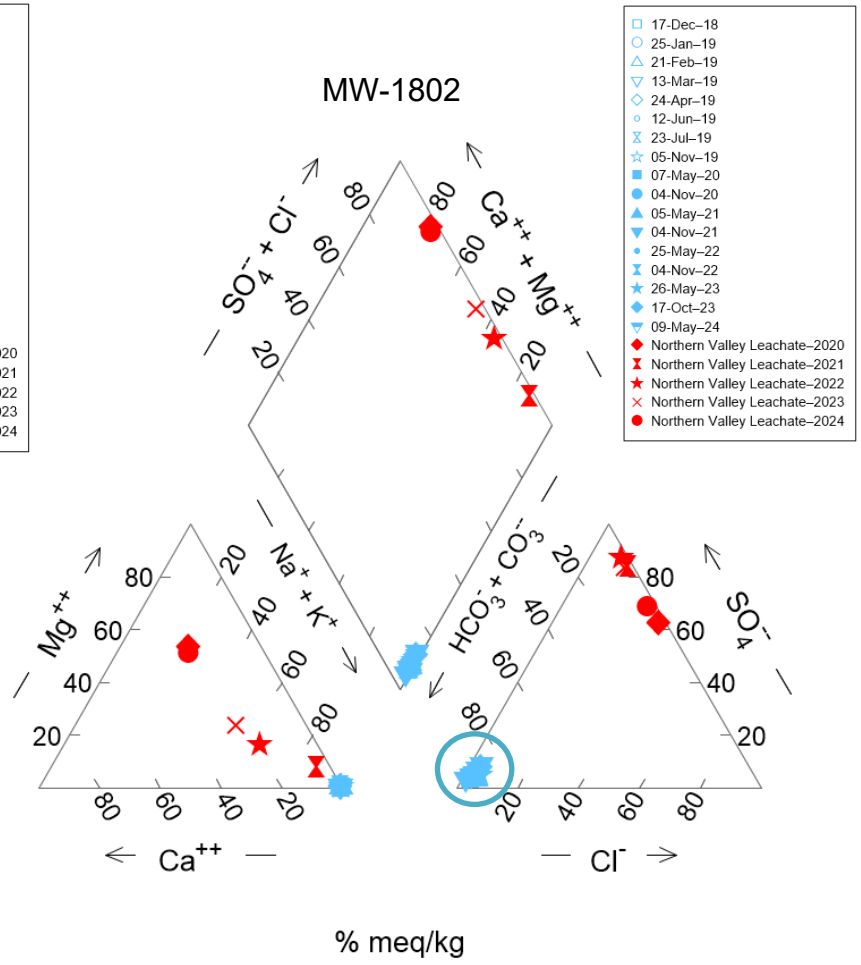
Geosyntec consultants

Columbus, Ohio | January 2025

Figure **2**

A:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Amos\2024\AEP-Amos_Landfill_GW_2024-07July_ver.mxd. Okiemute.Commander. 7/26/2024. CHA8423/04/08.




Notes: Landfill leachate samples were collected on August 25, 2020, October 7, 2021, September 13, 2022, November 8, 2023, and July 29, 2024. Leachate samples were not analyzed for potassium ($K^+$), and potassium values were assumed to be zero. All groundwater samples for each monitoring location are circled in blue on the anion distribution triangle.

% meq/kg: percent milliequivalents per kilogram

**Piper Diagrams: Leachate Comparison**
Amos Landfill

Geosyntec consultants

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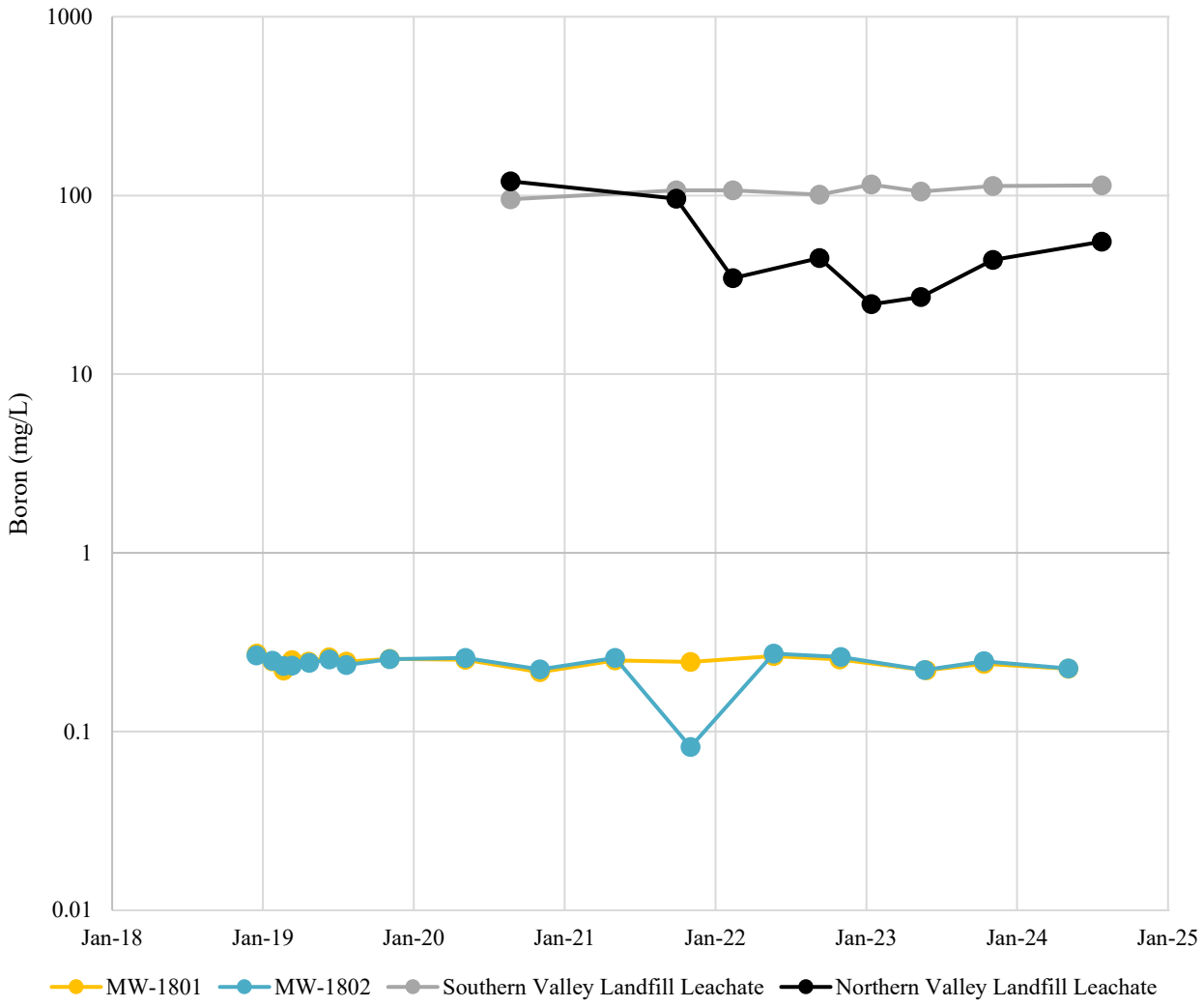
Columbus, Ohio

January 2025

Figure 3




Notes: Data were collected under the federal coal combustion residual (CCR) rule requirements and represents total boron in groundwater.

mg/L: milligrams per liter

**Boron Time Series Graph**
Amos Landfill

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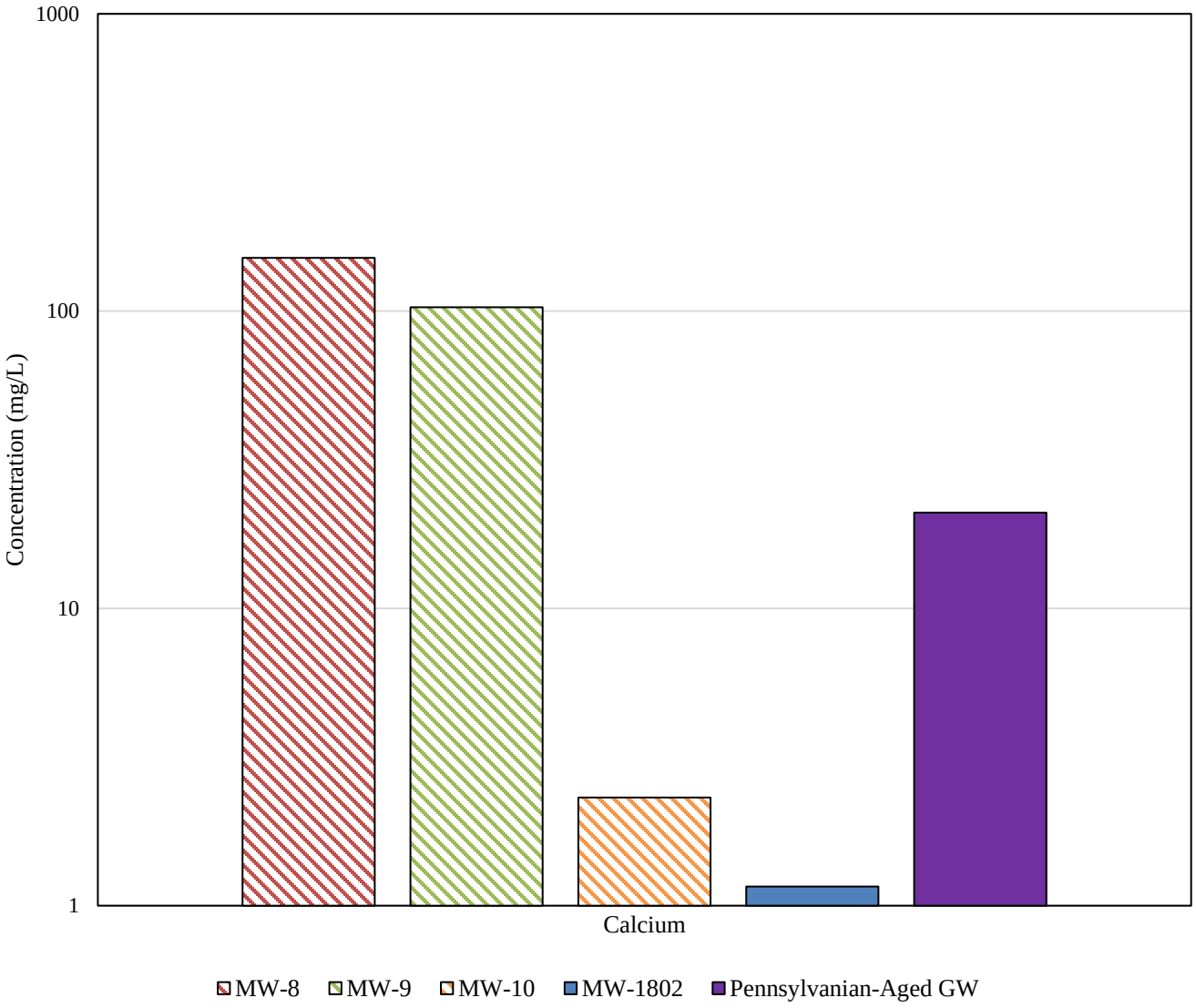
January 2025

Figure **4**




Notes: Upgradient wells MW-8, MW-9, and MW-10 and downgradient well MW-1802 show the maximum calcium concentration from all past collected data at each monitoring well. 'Pennsylvanian-Aged GW', shown in purple, represents median Pennsylvanian-aged aquifer data from Chambers et al., 2012. Data for Amos monitoring wells were collected under the federal CCR rule and represents total calcium in groundwater.
mg/L: milligrams per liter

**Calcium Comparison**
Amos Landfill

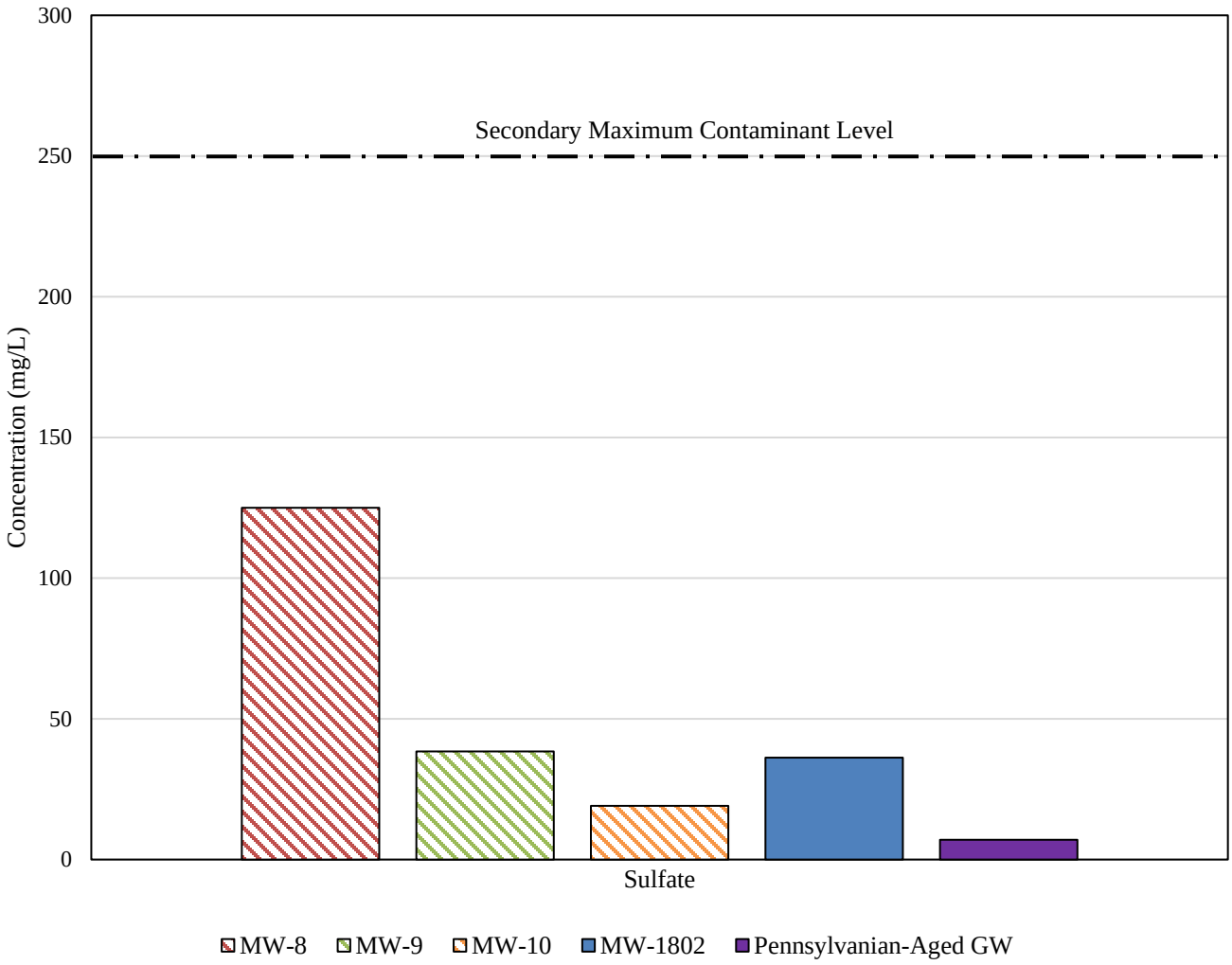
Geosyntec consultants

AMERICAN ELECTRIC POWER

Columbus, Ohio

January 2025

Figure **5**




Notes: Upgradient wells MW-8, MW-9, and MW-10 and downgradient well MW-1802 show the maximum sulfate concentration from all past collected data at each monitoring well. 'Pennsylvanian-Aged GW', shown in purple, represents median Pennsylvanian-aged aquifer data from Chambers et al., 2012. Data for Amos monitoring wells were collected under the federal CCR rule and represents total sulfate in groundwater.
mg/L: milligrams per liter

**Sulfate Comparison**
Amos Landfill

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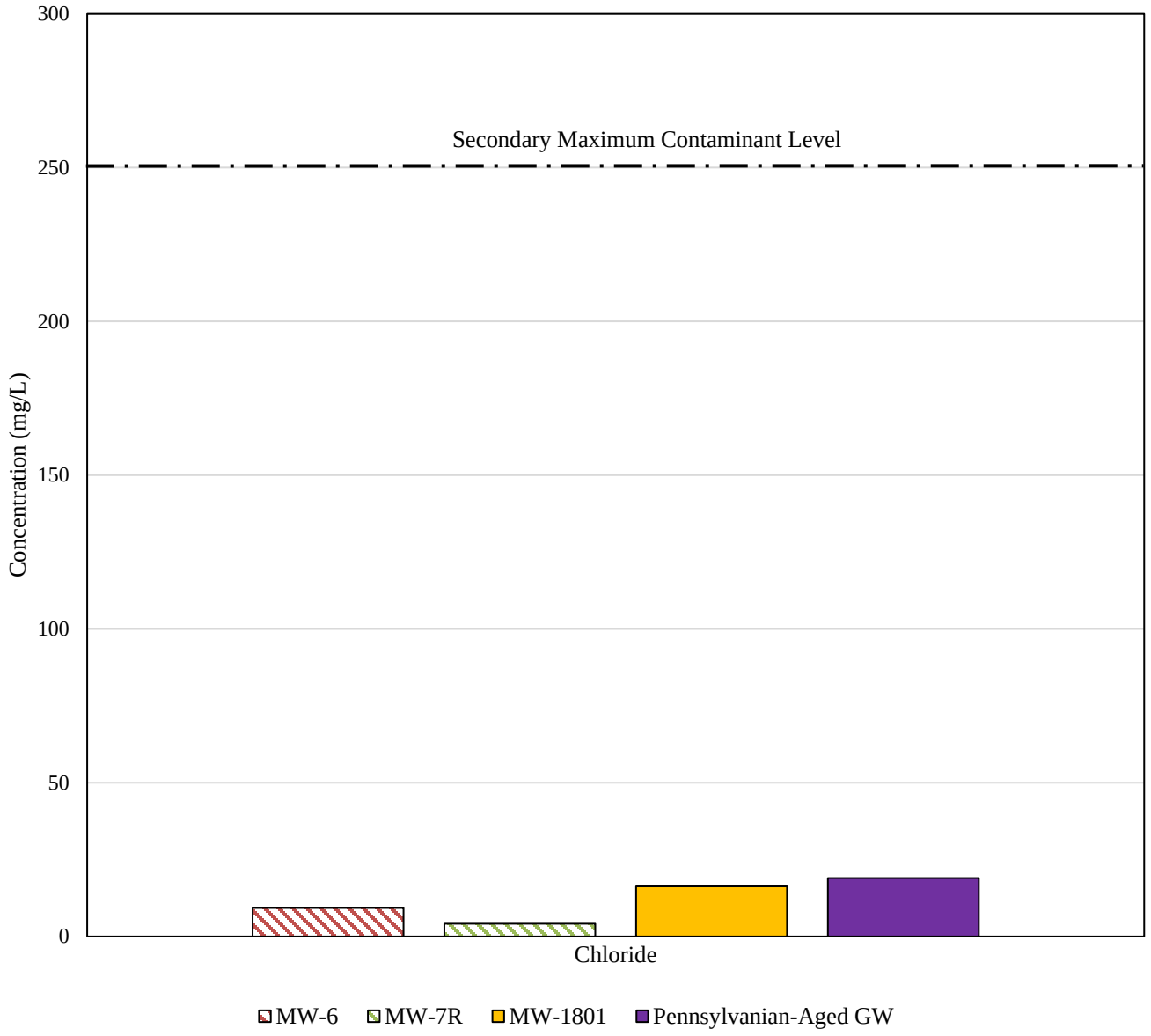
Columbus, Ohio

January 2025

Figure **6**




Notes: Upgradient wells MW-6 and MW-7R and downgradient well MW-1801 show the maximum chloride concentration from all past collected data at each monitoring well. 'Pennsylvanian-Aged GW', shown in purple, represents median Pennsylvanian-aged aquifer data from Chambers et al., 2012. Data for Amos monitoring wells were collected under the federal CCR rule and represents total chloride in groundwater.
mg/L: milligrams per liter

**Chloride Comparison**
Amos Landfill

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Columbus, Ohio | January 2025

Figure **7**

# ATTACHMENT A

## MW-1801 and MW-1802 Boring Logs and Well Construction Diagrams

AMERICAN ELECTRIC POWER SERVICE CORPORATION

# AEP CIVIL ENGINEERING LABORATORY

## LOG OF BORING

JOB NUMBER **WV015976.0005**

COMPANY **American Electric Power**

PROJECT **Amos - FGD Landfill**

COORDINATES **N 38.5 E 81.6**

GROUND ELEVATION **735.6** SYSTEM **NAVD88**

| | | | |
|---|---|---|---|
| Water Level, ft | ▽ 21.0 | ▼ | ▼ |
| TIME | | | |
| DATE | 8/15/2018 | | |

BORING NO. **MW-1801** DATE **5/3/19** SHEET **1** OF **5**

BORING START **8/7/18** BORING FINISH **8/8/18**

PIEZOMETER TYPE **PVC** WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.8** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **50.4** BOTTOM **114.4**

WELL DEVELOPMENT **Surge/Purge** BACKFILL **Bentonite Grout**

FIELD PARTY **Zachary Racer (AEP)** RIG **Direct Circulation - Wireline Core**

| SAMPLE NUMBER | SAMPLE | SAMPLE DEPTH IN FEET FROM | TO | STANDARD PENETRATION RESISTANCE BLOWS / 6" | TOTAL LENGTH RECOVERY | RQD % | DEPTH IN FEET | GRAPHIC LOG | USCS | SOIL / ROCK IDENTIFICATION | WELL | DRILLER'S NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | CL ML | 0-5': SILTY CLAY; 2.5YR 5/6 (red); moist; backfill material. | | 0-49': Riser |
| | | 5.0 | 6.5 | 50/4 | 3.6 | | 5 | | | 5-6': SANDSTONE. | | |
| | | 6.5 | 8.0 | 48-23-15 | 3.6 | | | | CL ML | 6-6.3': SHALE; GLEY1 5/N (gray); dry; thin bedded; hard. | | |
| | | | | | | | | | ML | 6.3-6.5': SILTY CLAY; red; moist; hard | | |
| | | 8.0 | 9.5 | 11-3-5 | 7.2 | | | | MH | 6.5-8': SILT; 10YR 6/2 (tan); with sandstone and shale fragments; compacted fill material. 8-9.5': CLAYEY SILT; 5YR 4/2 (brown); firm; moist; fill material. | | |
| | | 9.5 | 11.0 | 4-4-7 | 10.8 | | 10 | | CL ML | 9.5-11': SILTY CLAY; 10YR 6/3 (brown) to brown clayey silt; dry; crumbly; fill material. | | |
| | | 11.0 | 12.5 | 4-8-50/3 | 10.8 | | | | CL ML | 11-12.5': SILTY CLAY; 5YR 4/2 (brown); moist; firm. | | |
| | | 12.5 | 14.0 | 50/3 | | | | | ML | Note: Sandstone at 12-12.3'. 12.5-14': SILT, compacted; 10YR 7/4 (tan); very hard; dry; fill material. | | |
| | | 14.0 | 15.5 | 50/4 | | | | | | 14-14.5': SILTY SHALE material, weathered; mottled tan and dark brown; dry; very hard. | | |
| | | 14.9 | 19.9 | | 51 | | 15 | | | 14.5-14.9': SANDSTONE; strong field strength; 2.5Y 6/2; fine-grained texture; massive structure; slightly to moderately decomposed; moderately disintegrated with Fe staining; fracture at 14.3-14.5'. 14.9-19.9': SHALE; moderate field strength; GLEY1 5/GY; fine-grained texture; thinly bedded; moderately decomposed along bedding planes; moderately disintegrated along bedding planes and fracture; vertical fracture with Fe staining at 15.5-16.5'. | | |

**TYPE OF CASING USED**

| | | |
|---|---|---|
| **X** | NQ-2 ROCK CORE | |
| **NA** | 6" x 3.25 HSA | |
| **NA** | 9" x 6.25 HSA | |
| **NA** | HW CASING ADVANCER | 4" |
| **NA** | NW CASING | 3" |
| **NA** | SW CASING | 6" |
| **NA** | AIR HAMMER | 8" |

*Continued Next Page*

PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON

RECORDER **A. Gillespie**

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **WV015976.0005**

COMPANY **American Electric Power** BORING NO. **MW-1801** DATE **5/3/19** SHEET **2** OF **5**

PROJECT **Amos - FGD Landfill** BORING START **8/7/18** BORING FINISH **8/8/18**

| SAMPLE NUMBER | SAMPLE | SAMPLE DEPTH IN FEET FROM | TO | STANDARD PENETRATION RESISTANCE BLOWS / 6" | TOTAL LENGTH RECOVERY | RQD % | DEPTH IN FEET | GRAPHIC LOG | U S C S | SOIL / ROCK IDENTIFICATION | WELL | DRILLER'S NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 19.9 | 24.9 | 8-7-6 | 55 | | | | | 19.9-24.9': SHALE; moderate field strength; GLEY1 5/GY; fine-grained texture; thinly bedded; moderately decomposed along bedding planes; moderately disintegrated; moderately to intensely fractured.<br><br>Transition to strong field strength, 2.5YR 4/4; fine-grained texture; massive structure to thinly bedded; slightly decomposed; slightly disintegrated; slightly to moderately fractured. | | |
| | | 24.9 | 34.9 | 4-4-13 | 72 | | 25 | | | 24.9-25.2': SHALE; strong field strength; fine-grained structure; massive structure to thinly bedded; slightly decomposed; slightly disintegrated; slightly to moderately fractured.<br>25.2-30.7': CLAYSTONE/MUDSTONE, highly weathered; very weak field strength; 10YR 5/3; very fine-grained texture with sandstone fragments; massive structure; highly decomposed; intensely disintegrated; unfractured. | | |
| | | 34.9 | 38.3 | 4-5-8 | 36 | | 30 | | | 30.7-32.5': SHALE; moderate field strength; 2.5YR 4/4 (red); fine-grained texture; thinly bedded; moderately decomposed; slightly to moderately disintegrated; slightly to moderately fractured.<br>32.5-34.9': CLAYSTONE/MUDSTONE; moderate field strength; GLEY1 4/104; fine-grained texture; massive structure; moderately decomposed; moderately disintegrated; moderately to intensely fractured. | | |
| | | 38.3 | 44.9 | 5-7-13-9-6-6 | 70 | | 35 | | | 34.9-38.3': CLAYSTONE/MUDSTONE; moderate to weak field strength; 2.5YR 4/4 (red) mottled with tan, black, and gray; fine-grained texture; massive structure; moderately to highly decomposed; intensely disintegrated, mottling tan and gray; moderately to intensely fractured.<br>38.3-44.9': CLAYSTONE/MUDSTONE; moderate to weak field strength; 2.5YR 4/4 (red) mottled with tan, black, and gray; fine-grained texture; massive structure; highly decomposed; intensely disintegrated; intensely fractured. | | |
| | | 44.9 | 50.0 | 4-4-7-8 | 50 | | 40 | | | | | |
| | | | | | | | 45 | | | 44.9-50': CLAYSTONE/MUDSTONE; moderate to weak field strength; 2.5YR 4/4 (red) mottled with | | |

*Continued Next Page*

AMERICAN ELECTRIC POWER SERVICE CORPORATION

# AEP CIVIL ENGINEERING LABORATORY

## LOG OF BORING

JOB NUMBER **WV015976.0005**

COMPANY **American Electric Power** BORING NO. **MW-1801** DATE **5/3/19** SHEET **3** OF **5**

PROJECT **Amos - FGD Landfill** BORING START **8/7/18** BORING FINISH **8/8/18**

| SAMPLE NUMBER | SAMPLE | SAMPLE DEPTH IN FEET FROM | TO | STANDARD PENETRATION RESISTANCE BLOWS / 6" | TOTAL LENGTH RECOVERY | RQD % | DEPTH IN FEET | GRAPHIC LOG | U S C S | SOIL / ROCK IDENTIFICATION | WELL | DRILLER'S NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 44.9 | 50.0 | 4-4-7-8 | 50 | | | | | tan, black, and gray; fine-grained texture; massive structure; highly decomposed; intensely disintegrated; intensely fractured. | | 49-52': Bentonite Pellets |
| | | 50.0 | 55.0 | 4-4-5-4 | 50 | | 50 | | | 50-56.7': CLAYSTONE/MUDSTONE; moderate field strength; 2.5YR 4/4 (red) mottled with tan, black, and gray; fine-grained texture; massive structure; moderately to highly decomposed, becomes less weathered at 50.3'; highly disintegrated, highly mottled; moderately to intensely fractured. | | 52-53': Secondary Filter Pack<br>53-75': Primary Filter Pack |
| | | 55.0 | 59.8 | 5-7-5-36 | 52 | | 55 | | | | | 55-75': Screen |
| | | 59.8 | 64.8 | 8-5-4-4-7-5-5-4 | 60 | | 60 | | | 56.7-58': SANDSTONE, interbedded; strong field strength; GLEY1 6/N (gray-green); fine-grained texture; thinly bedded; slightly decomposed; slightly disintigrated along fracture; moderately fractured at 56.7' and 57.1-57.5'.<br>58-58.8': SHALE, interbedded; strong field strength; 2.5YR 4/4 (red); fine-grained texture; thinly bedded; slightly decomposed; slightly disintigrated along fracture.<br>58.8-59.2': SANDSTONE, interbedded; strong field strength; GLEY1 6/N (gray-green); fine-grained texture; thinly bedded; slightly decomposed; slightly disintigrated along fracture.<br>59.2-59.8': SHALE, interbedded; strong field strength; 2.5YR 4/4 (red); fine-grained texture; thinly bedded; slightly decomposed; slightly disintigrated along fracture. | | |
| | | 64.8 | 74.8 | 4-5-4-6 | 76 | | 65 | | | 59.8-60.7': SANDSTONE; strong field strength; GLEY1 6/N; fine-grained texture; thinly bedded; slightly decomposed; slightly disintigrated; unfractured.<br>60.7-63.9': SHALE; moderate field strength; 2.5YR 4/4 (red); fine-grained texture; thinly bedded; moderately decomposed along bedding planes; moderately disintigrated with silt filled fractures; moderately fractured.<br>63.9-64.3': SANDSTONE; strong field strength; GLEY1 6/N (gray-green); fine-grained texture; thinly bedded; slightly decomposed; slightly disintigrated; unfractured. | | |
| | | | | | | | 70 | | | 64.3-64.8': SHALE; moderate field strength; 2.5YR 4/4 (red); fine-grained texture; thinly bedded; moderately decomposed; moderately | | |

*Continued Next Page*

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **WV015976.0005**

COMPANY **American Electric Power** BORING NO. **MW-1801** DATE **5/3/19** SHEET **4** OF **5**

PROJECT **Amos - FGD Landfill** BORING START **8/7/18** BORING FINISH **8/8/18**

| SAMPLE NUMBER | SAMPLE | SAMPLE DEPTH IN FEET FROM | TO | STANDARD PENETRATION RESISTANCE BLOWS / 6" | TOTAL LENGTH RECOVERY | RQD % | DEPTH IN FEET | GRAPHIC LOG | U S C S | SOIL / ROCK IDENTIFICATION | WELL | DRILLER'S NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 64.8 | 74.8 | 4-5-4-6 | 76 | | | | | disintigrated; moderately fractured. | | |
| | | | | | | | | | | 64.8-74.8': SHALE, highly weathered at base; moderate to weak field strength along some bedding planes; 2.5YR 3/3 (red); fine-grained texture; massive structure; moderately decomposed; moderately disintigrated, becomes more limestone fragments last 1 ft, 3-5 cm; moderately to intensely fractured. | | |
| | | 74.8 | 85.0 | | | | 75 | | | 74.8-85': SHALE, highly weathered; weak field strength; 2.5YR 4/4 (red) with tan and gray mottling; fine-grained texture; massive structure; highly decomposed; highly disintigrated, mottled; intensely fractured. | | 75-105': Bentonite |
| | | 85.0 | 95.0 | 5-4-4 | 120 | | 80 | | | 85-92.7': SANDSTONE; strong field strength; fine-grained texture; thinly bedded; fresh; slightly disintigrated, calcite in light colored beds/thin; slightly fractured. | | |
| | | | | | | | 85 | | | | | |
| | | | | | | | 90 | | | 92.7-94.6': SHALE; moderate field strength; fine-grained texture; massive structure; slightly decomposed; slightly disintigrated, some mottling; moderately fractured. | | |
| | | 95.0 | 105.0 | 7-4-4 | 120 | | 95 | | | 94.6-95': SANDSTONE; strong field strength; fine-grained texture; thinly bedded; fresh; slightly disintigrated, calcite in light colored beds/thin; slightly fractured at 94.6-95'. | | |
| | | | | | | | | | | 95-100.1': SANDSTONE; strong field strength; fine-grained texture; thinly bedded; fresh; slightly disintigrated; slightly fractured at 95-95.2'. | | |

*Continued Next Page*

AMERICAN ELECTRIC POWER SERVICE CORPORATION

# AEP CIVIL ENGINEERING LABORATORY

## LOG OF BORING

JOB NUMBER **WV015976.0005**

COMPANY **American Electric Power** BORING NO. **MW-1801** DATE **5/3/19** SHEET **5** OF **5**

PROJECT **Amos - FGD Landfill** BORING START **8/7/18** BORING FINISH **8/8/18**

| SAMPLE NUMBER | SAMPLE | SAMPLE DEPTH IN FEET FROM | TO | STANDARD PENETRATION RESISTANCE BLOWS / 6" | TOTAL LENGTH RECOVERY | RQD % | DEPTH IN FEET | GRAPHIC LOG | U S C S | SOIL / ROCK IDENTIFICATION | WELL | DRILLER'S NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 95.0 | 105.0 | 7-4-4 | 120 | | 100 | | | 100.1-101.5': SHALE and sandstone interbedded; moderate field strength; fine-grained texture; thinly bedded; slightly decomposed; slightly disintigrated; slightly fractured at 100.2-100.5'.<br>101.5-105': SHALE; moderate to weak field strength; fine-grained texture; massive structure; highly decomposed; moderately to highly disintigrated mottling with silt filled fractures; highly fractured. | | |
| | | | | | | | 105 | | | | | |
| | | | | | | | 110 | | | | | |
| | | | | | | | 115 | | | | | |
| | | | | | | | 120 | | | | | |

AMERICAN ELECTRIC POWER SERVICE CORPORATION

# AEP CIVIL ENGINEERING LABORATORY

## LOG OF BORING

JOB NUMBER **WV015976.0005**

COMPANY **American Electric Power**

PROJECT **Amos - FGD Landfill**

COORDINATES **N 38.5 E 81.9**

GROUND ELEVATION **709.8** SYSTEM **NAVD88**

| | | | |
|---|---|---|---|
| Water Level, ft | ▽ 35.0 | ▼ | ▼ |
| TIME | | | |
| DATE | 8/21/2019 | | |

BORING NO. **MW-1802** DATE **5/3/19** SHEET **1** OF **5**

BORING START **8/20/18** BORING FINISH **8/21/18**

PIEZOMETER TYPE **NA** WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.91** DIA **2"**

DEPTH TO TOP OF WELL SCREEN **50** BOTTOM **114.4**

WELL DEVELOPMENT **Surge/Purge** BACKFILL **Bentonite Grout**

FIELD PARTY **Zachary Racer (AEP)** RIG **Direct Circulation - Wireline Core**

| SAMPLE NUMBER | SAMPLE | SAMPLE DEPTH IN FEET FROM | TO | STANDARD PENETRATION RESISTANCE BLOWS / 6" | TOTAL LENGTH RECOVERY | RQD % | DEPTH IN FEET | GRAPHIC LOG | USCS | SOIL / ROCK IDENTIFICATION | WELL | DRILLER'S NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | GW | 0-3.5': GRAVEL backfill; large rip-rap and smaller compacted gravels. | | 0-41': Bentonite Grout |
| | | | | | | | | | CL | 3.5-4.5': SILTY CLAY; brown; moist; soft; backfill material. | | |
| | | 4.5 | 6.0 | 6-4-5 | 0 | | 5 | | | 4.5-6': NO RECOVERY, due to gravel blocking cutting shoe. | | |
| | | 6.0 | 7.5 | 4-3-4 | 3.6 | | | | CL | 6-17': SILTY CLAY; 7.5YR 4/3 (brown); moist; firm; compacted backfill material; becomes wet at 12.5'. | | |
| | | 7.5 | 9.0 | 3-4-5 | 7.2 | | | | | | | |
| | | 9.0 | 10.5 | 4-4-6 | 18 | | 10 | | | | | |
| | | 10.5 | 12.0 | 5-4-5 | 13.2 | | | | | | | |
| | | 12.0 | 13.5 | 3-4-6 | 15.6 | | | | | | | |
| | | 13.5 | 15.0 | 3-5-8 | 14.4 | | | | | | | |
| | | 15.0 | 16.5 | 4-7-9 | 15.6 | | 15 | | | | | |
| | | 16.5 | 18.0 | 6-25-8 | 16.8 | | | | | 17-17.5': SANDSTONE, weathered; GLEY1 7/N (gray); dry. | | |
| | | 18.0 | 19.5 | 7-23-15 | 14.4 | | | | CL | 17.5-19.5': SILTY CLAY; GLEY1 6/N (gray) mottled with brown, red, tan; moist; soft; crumbles easily. | | |
| | | 19.5 | 21.0 | 20->50/4 | 10.8 | | | | CL | | | |

**TYPE OF CASING USED**

| | | |
|---|---|---|
| **X** | NQ-2 ROCK CORE | |
| **NA** | 6" x 3.25 HSA | |
| **NA** | 9" x 6.25 HSA | |
| **NA** | HW CASING ADVANCER | 4" |
| **NA** | NW CASING | 3" |
| **NA** | SW CASING | 6" |
| **NA** | AIR HAMMER | 8" |

*Continued Next Page*

PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON

RECORDER **A. Gillespie**

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **WV015976.0005**

COMPANY **American Electric Power** BORING NO. **MW-1802** DATE **5/3/19** SHEET **2** OF **5**

PROJECT **Amos - FGD Landfill** BORING START **8/20/18** BORING FINISH **8/21/18**

| SAMPLE NUMBER | SAMPLE | SAMPLE DEPTH IN FEET FROM | TO | STANDARD PENETRATION RESISTANCE BLOWS / 6" | TOTAL LENGTH RECOVERY | RQD % | DEPTH IN FEET | GRAPHIC LOG | U S C S | SOIL / ROCK IDENTIFICATION | WELL | DRILLER'S NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 19.5 | 21.0 | 20->50/4 | 10.8 | | | | | 19.5-22.5': SILTY CLAY; GLEY1 6/N (gray) mottled with brown, tan; dry; soft; crumbles easily. | | |
| | | 21.0 | 22.5 | 27-50/5 | 9.6 | | | | | | | |
| | | 22.5 | 24.4 | 4 | 23 | | | | | 22.5-24': SILTSTONE; moderate to weak field strength; GLEY1 6/N; fine-grained texture; massive structure; highly decomposed; moderately to highly disintegrated with tan/brown mottling; moderately to intensely fractured. | | |
| | | 24.4 | 29.4 | | 22 | | 25 | | | 24-24.4': SILTSTONE; weak field strength; 10R 4/4 (red) mottled; fine-grained texture; massive structure; highly decomposed; moderately to intensely fractured. | | |
| | | | | | | | | | | 24.4-29.4': SILTSTONE; weak field strength; 10R 4/4 (red) mottled with tan, gray, and black; fine-grained texture; massive structure; highly decomposed; highly disintegrated, highly mottled; moderately fractured. | | |
| | | 29.4 | 33.7 | 5-11-6 | 40 | | 30 | | | 29.4-32.8': SHALE, weathered; moderate field strength; 10YR 4/4 (red) mottled; fine-grained texture; massive structure; moderately decomposed; moderately to intensely disintegrated; moderately fractured. | | |
| | | 33.7 | 39.4 | 5-4-4-7-5 | 59 | | 35 | | | 32.8-33.7': SHALE; moderate field strength; 5YR 5/4 (tan) mottled; fine-grained texture; massive structure; moderately to highly decomposed; moderately to intensely disintegrated; moderately to intensely fractured. | | |
| | | | | | | | | | | 33.7-39.4': SHALE; moderate field strength; 10YR 4/4 (red) with gray, tan, and black mottling; fine-grained texture; massive structure; moderately to highly decomposed; moderately to intensely disintegrated; intensely fractured. | | |
| | | 39.4 | 44.4 | 4-6-4-4 | 57 | | 40 | | | 39.4-44.4': SHALE; moderate field strength; 10YR 4/4 (red) with gray, tan, and black mottling; fine-grained texture; massive structure; moderately to highly decomposed; moderately to intensely disintegrated; intensely fractured. | | 41-44': Bentonite Pellets |
| | | 44.4 | 54.4 | 7-8-7-5-5-24-5 | 120 | | 45 | | | 44.4-47.8': SHALE, highly weathered; weak field strength; 10YR 4/4 (red) with gray, tan, and black mottling; fine-grained texture; massive structure; | | 44-45': Secondary Filter Pack<br>45-71': Primary Filter Pack |

*Continued Next Page*

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **WV015976.0005**

COMPANY **American Electric Power** BORING NO. **MW-1802** DATE **5/3/19** SHEET **3** OF **5**

PROJECT **Amos - FGD Landfill** BORING START **8/20/18** BORING FINISH **8/21/18**

| SAMPLE NUMBER | SAMPLE | SAMPLE DEPTH IN FEET FROM | TO | STANDARD PENETRATION RESISTANCE BLOWS / 6" | TOTAL LENGTH RECOVERY | RQD % | DEPTH IN FEET | GRAPHIC LOG | U S C S | SOIL / ROCK IDENTIFICATION | WELL | DRILLER'S NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 44.4 | 54.4 | 7-8-7-5-5-24-5 | 120 | | | | | highly decomposed; intensely disintegrated; intensely fractured. | | |
| | | | | | | | | | | 47.8-49.9': SHALE, less weathered; moderate field strength; 10R 3/3 (red); fine-grained texture; massive structure; moderately decomposed; moderately disintegrated; moderately fractured. | | |
| | | | | | | | 50 | | | 49.9-50.8': SHALE, interbedded with sandstone; moderate field strength; GLEY1 4/N; fine-grained texture; thinly bedded; moderately decomposed; slightly disintegrated; moderately fractured. | | 50-70': Screen |
| | | | | | | | | | | 50.8-52.8': SHALE; moderate to strong field strength; 10R 4/3 (red); fine-grained texture; massive structure; slightly decomposed; moderately disintegrated; slightly fractured. | | |
| | | | | | | | | | | 52.8-53.1': SHALE, interbedded with sandstone; strong field strength; GLEY1 4/5GY; fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated; unfractured. | | |
| | | 54.4 | 64.4 | 8-12-5-6-7-4-4-4 | 114 | | 55 | | | 53.1-54.4': SHALE; moderate field strength; 10R 4/3 (red); fine-grained texture; massive structure; moderately decomposed; moderately disintegrated; moderately fractured. | | |
| | | | | | | | | | | 54.4-55.4': SANDSTONE, interbedded with shale; moderate field strength; 10R 4/3 (red); fine-grained texture; massive structure; moderately decomposed; moderately disintegrated; slightly to moderately fractured. | | |
| | | | | | | | 60 | | | 55.4-57.1': SHALE, interbedded with sandstone; moderate field strength; GLEY1 4/3, 10R 4/3; fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated; moderately fractured. | | |
| | | | | | | | | | | 57.1-64.4': SHALE, weathered; moderate to weak field strength; 10R 4/3 (red); fine-grained texture; massive structure; moderately to highly decomposed; moderately to intensely disintegrated with intense gray mottling; intensely fractured. | | |
| | | 64.4 | 74.4 | 4-6-8-6-4-5-4-4-5 | 117 | | 65 | | | 64.4-70.5': SHALE, highly weathered; moderate to weak field strength; 10R 4/3 (red); fine-grained texture; massive structure; moderately to intensely disintegrated with gray mottling; intensely fractured. | | |
| | | | | | | | 70 | | | 70.5-74.4': SHALE, interbedded with sandstone; strong field strength; 10R 4/3 (red) interbedded with GLEY1 4/N (gray-green); fine-grained | | |

*Continued Next Page*

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **WV015976.0005**

COMPANY **American Electric Power** BORING NO. **MW-1802** DATE **5/3/19** SHEET **4** OF **5**

PROJECT **Amos - FGD Landfill** BORING START **8/20/18** BORING FINISH **8/21/18**

| SAMPLE NUMBER | SAMPLE | SAMPLE DEPTH IN FEET FROM | TO | STANDARD PENETRATION RESISTANCE BLOWS / 6" | TOTAL LENGTH RECOVERY | RQD % | DEPTH IN FEET | GRAPHIC LOG | U S C S | SOIL / ROCK IDENTIFICATION | WELL | DRILLER'S NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 64.4 | 74.4 | 4-6-8-6-4-5-4-4-5 | 117 | | | | | texture; thinly bedded; slightly to moderately decomposed along some bedding planes; moderately disintegrated with silt filled fractures; moderately fractured. | | |
| | | 74.4 | 84.4 | 8-7-5-5-14-8-7-22-12 | 120 | | 75 | | | 74.4-77.1': SHALE, with some interbedded sandstone lenses; moderate field strength; 10R 4/3 (red); fine-grained texture; thinly bedded; slightly to moderately decomposed at some bedding planes; slightly disintegrated; moderately fractured. | | |
| | | | | | | | 80 | | | 77.1-82.7': SANDSTONE, with some red shale lenses; strong field strength; GLEY1 4/N; fine-grained texture; thinly bedded; fresh; moderately disintegrated, calcite reacts to HCl in light colored bands within 0.5' of surrounding contact lines, no HCl/calcite in fractures, no Fe staining; moderately fractured. | | |
| | | | | | | | | | | 82.7-84.4': SHALE, with some interbedded sandstone lenses; moderate field strength; 10R 4/3 (red); fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated; moderately fractured. | | |
| | | 84.4 | 94.4 | 10-11-6-7-7-8-9-8-7-6-6-7-10 | 120 | | 85 | | | 84.4-86.7': SHALE, with sandstone lenses; moderate field strength; 10R 4/2 (red) with GLEY1 4/N lenses; fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated; moderately fractured. | | |
| | | | | | | | | | | 86.7-89.2': SANDSTONE, with shale lenses; moderate field strength; GLEY1 4/N with 10R 4/2 lenses; fine-grained texture; thinly bedded; slightly decomposed; slightly disintegrated; moderately fractured. | | |
| | | | | | | | 90 | | | 89.2-94.4': SANDSTONE; strong field strength; GLEY1 6/N; fine-grained texture; thinly bedded, micaceous; fresh; slightly disintegrated, some calcite in light bands, no staining, no calcite in fractures; slightly to moderately fractured along bedding planes; fracture at 92.8'. | | |
| | | 94.4 | 104.4 | 7-4-5-4-9-9-8-5-11-5-6-10-19 | 120 | | 95 | | | 94.4-104.4': SANDSTONE; strong field strength; GLEY1 6/N; fine-grained texture; thinly bedded, micaceous, cross-bedding at 94.4-94.8; fresh; slightly disintegrated, calcite in some light bedded planes, no calcite or Fe staining noted in fractures; slightly to moderately fractured along bedding planes. | | |

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **WV015976.0005**

COMPANY **American Electric Power** BORING NO. **MW-1802** DATE **5/3/19** SHEET **5** OF **5**

PROJECT **Amos - FGD Landfill** BORING START **8/20/18** BORING FINISH **8/21/18**

| SAMPLE NUMBER | SAMPLE | SAMPLE DEPTH IN FEET FROM | TO | STANDARD PENETRATION RESISTANCE BLOWS / 6" | TOTAL LENGTH RECOVERY | RQD % | DEPTH IN FEET | GRAPHIC LOG | U S C S | SOIL / ROCK IDENTIFICATION | WELL | DRILLER'S NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 94.4 | 104.4 | 7-4-5-4-9-9-8-5-11-5-6-10-19 | 120 | | 100 | | | | | |
| | | 104.4 | 114.4 | 15-6-21-6-4-4-8-8-6-4-13-5-7 | 120 | | 105 | | | 104.4-108': SANDSTONE; strong field strength; GLEY1 6/N; fine to medium-grained texture; thinly bedded, micaceous, shale fragments; fresh; moderately disintegrated, calcite along entire sandstone void and shale fragments at base, calcite in void; slightly fractured. | | |
| | | | | | | | | | | 108-108.9': SHALE, with interbedded sandstone; moderate field strength; GLEY1 4/N, 10R 4/3 bands; thinly bedded; moderately decomposed between bedding planes; moderately disintegrated along bedding planes; moderately fractured. | | |
| | | | | | | | 110 | | | 108.9-114.4': SHALE; moderate field strength; 10R 4/3 (red) with GLEY1 4/N mottling; fine-grained texture; massive structure; moderately decomposed; moderately to intensely disintegrated, mottling; moderately fractured. | | |
| | | | | | | | 115 | | | | | |
| | | | | | | | 120 | | | | | |

AEP - AEP.GDT - 5/3/19 11:49 - S:\KNOXVILLE-TN\FOR NICOLE AEP LOG EDIT FILES\GINT LOGS OUTPUT\AEP MOUNTAINEER\AEP MOUNTAINEER.GPJ

# ATTACHMENT B
## Stress-Relief Fracture Conceptual Site Model

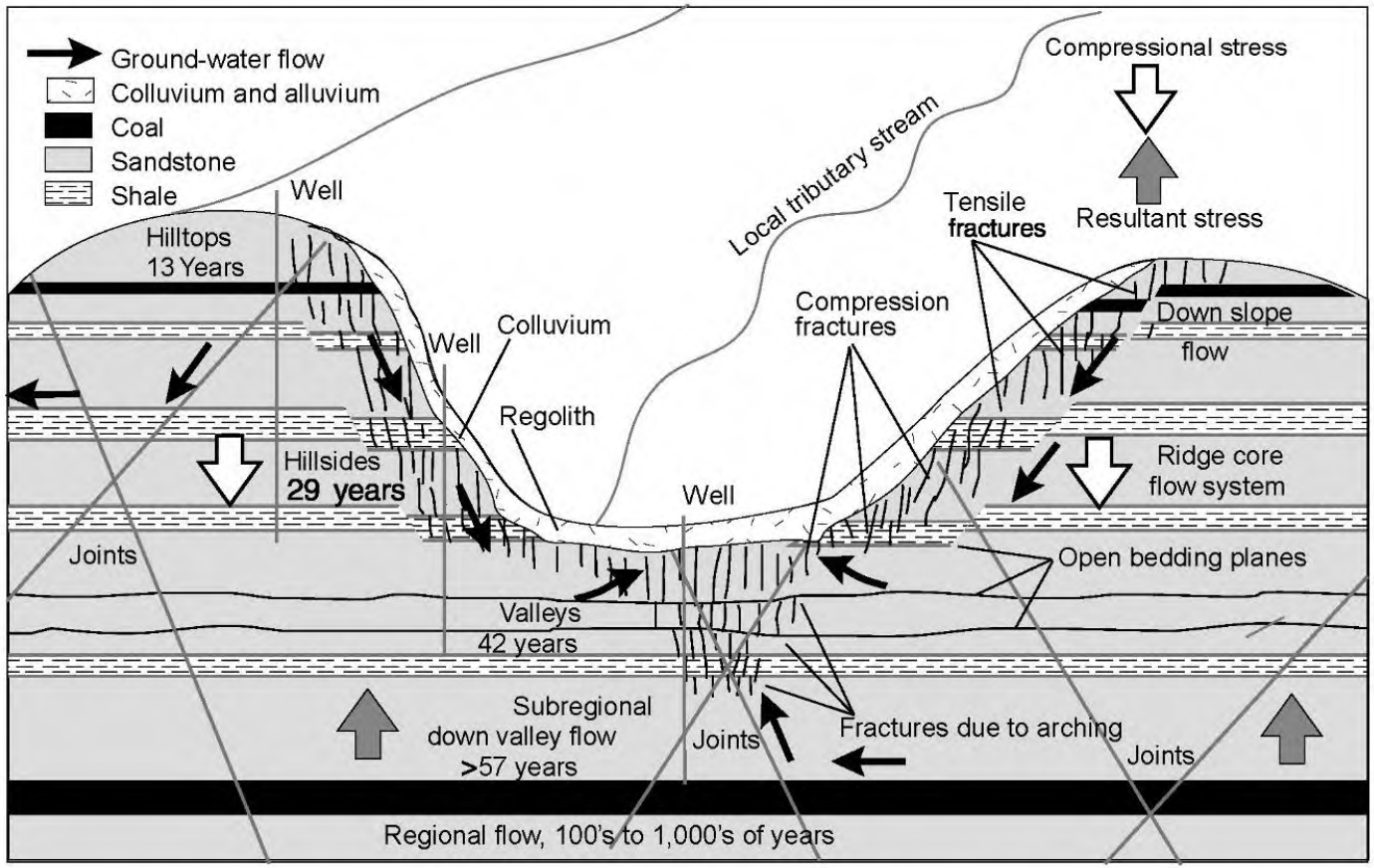


**Figure 3.** Revised conceptual model of ground-water flow in an Appalachian Plateaus fractured-bedrock aquifer including apparent age of ground water (Modified from Wyrick and Borchers, fig. 3.2-1, 1981 and Kozar, 1998).


**References:**

- United States Geological Survey (USGS), Wyrick, G.D. and J.W. Borchers, 1981. Hydrologic Effects of Stress-Relief Fracturing in an Appalachian Valley. Water-Supply Paper 2177.


AEP AMOS GENERATING PLANT - FGD LANDFILL
WINFIELD ROAD
WINFIELD, WEST VIRGINIA

**STRESS RELIEF FRACTURE SYSTEM CONCEPTUAL SITE MODEL**

ARCADIS Design & Consultancy for natural and built assets

FIGURE
4

# ATTACHMENT C
## Solid Samples Analytical Report

eurofins | Environment Testing



# ANALYTICAL REPORT

## PREPARED FOR

Attn: Allison Kreinberg
Geosyntec Consultants Inc
500 West Wilson Bridge Road
Suite 250
Worthington, Ohio 43085

Generated 5/1/2024 4:51:58 PM

## JOB DESCRIPTION

AEP Amos Power Plant - ASD

## JOB NUMBER

240-202469-1

Eurofins Cleveland
180 S. Van Buren Avenue
Barberton OH 44203

See page two for job notes and contact information.



myEOL

## Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

## Authorization

Roxanne Cisneros

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Authorized for release by
Roxanne Cisneros, Senior Project Manager
roxanne.cisneros@et.eurofinsus.com
(615)301-5761

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# Definitions/Glossary

Client: Geosyntec Consultants Inc
Job ID: 240-202469-1
Project/Site: AEP Amos Power Plant - ASD

## Qualifiers

### Metals

| Qualifier | Qualifier Description |
|---|---|
| 4 | MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable. |

### General Chemistry

| Qualifier | Qualifier Description |
|---|---|
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |

## Glossary

| Abbreviation | These commonly used abbreviations may or may not be present in this report. |
|---|---|
| ¤ | Listed under the "D" column to designate that the result is reported on a dry weight basis |
| %R | Percent Recovery |
| CFL | Contains Free Liquid |
| CFU | Colony Forming Unit |
| CNF | Contains No Free Liquid |
| DER | Duplicate Error Ratio (normalized absolute difference) |
| Dil Fac | Dilution Factor |
| DL | Detection Limit (DoD/DOE) |
| DL, RA, RE, IN | Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample |
| DLC | Decision Level Concentration (Radiochemistry) |
| EDL | Estimated Detection Limit (Dioxin) |
| LOD | Limit of Detection (DoD/DOE) |
| LOQ | Limit of Quantitation (DoD/DOE) |
| MCL | EPA recommended "Maximum Contaminant Level" |
| MDA | Minimum Detectable Activity (Radiochemistry) |
| MDC | Minimum Detectable Concentration (Radiochemistry) |
| MDL | Method Detection Limit |
| ML | Minimum Level (Dioxin) |
| MPN | Most Probable Number |
| MQL | Method Quantitation Limit |
| NC | Not Calculated |
| ND | Not Detected at the reporting limit (or MDL or EDL if shown) |
| NEG | Negative / Absent |
| POS | Positive / Present |
| PQL | Practical Quantitation Limit |
| PRES | Presumptive |
| QC | Quality Control |
| RER | Relative Error Ratio (Radiochemistry) |
| RL | Reporting Limit or Requested Limit (Radiochemistry) |
| RPD | Relative Percent Difference, a measure of the relative difference between two points |
| TEF | Toxicity Equivalent Factor (Dioxin) |
| TEQ | Toxicity Equivalent Quotient (Dioxin) |
| TNTC | Too Numerous To Count |

## Job ID: 240-202469-1 — Eurofins Cleveland

**Job Narrative**
**240-202469-1**

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

**Receipt**
The samples were received on 4/8/2024 12:30 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 24.3°C.

**Metals**
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

**General Chemistry**
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

**Organic Prep**
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

# Method Summary

Client: Geosyntec Consultants Inc
Project/Site: AEP Amos Power Plant - ASD

Job ID: 240-202469-1

| Method | Method Description | Protocol | Laboratory |
|---|---|---|---|
| 6010D | Metals (ICP) | SW846 | EET CLE |
| 9056A | Anions, Ion Chromatography | SW846 | EET CLE |
| 9081 | Cation Exchange Capacity (CEC) | SW846 | EET HOU |
| Moisture | Percent Moisture | EPA | EET CLE |
| Part Size Red | Particle Size Reduction Preparation | None | EET CLE |
| 3050B | Preparation, Metals | SW846 | EET CLE |
| 9081 | Cation Exchange Capacity (CEC) | SW846 | EET HOU |
| DI Leach | Deionized Water Leaching Procedure | ASTM | EET CLE |

**Protocol References:**

ASTM = ASTM International
EPA = US Environmental Protection Agency
None = None
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

EET CLE = Eurofins Cleveland, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396
EET HOU = Eurofins Houston, 4145 Greenbriar Dr, Stafford, TX 77477, TEL (281)240-4200

# Sample Summary

Client: Geosyntec Consultants Inc
Project/Site: AEP Amos Power Plant - ASD

Job ID: 240-202469-1

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---|---|---|---|---|
| 240-202469-1 | MW-1801-SS-59.8-60.5-20240403 | Solid | 04/03/24 11:00 | 04/08/24 12:30 |
| 240-202469-2 | MW-1802-SS-56.3-56.9-20240403 | Solid | 04/03/24 11:05 | 04/08/24 12:30 |
| 240-202469-3 | MW-1801-SH-55.9-56.6-20240403 | Solid | 04/03/24 11:10 | 04/08/24 12:30 |
| 240-202469-4 | MW-1801-SH-58.0-58.8-20240403 | Solid | 04/03/24 11:15 | 04/08/24 12:30 |
| 240-202469-5 | MW-1802-SH-51.9-52.5-20240403 | Solid | 04/03/24 11:20 | 04/08/24 12:30 |
| 240-202469-6 | MW-1802-SH-55.3-55.8-20240403 | Solid | 04/03/24 11:25 | 04/08/24 12:30 |

# Detection Summary

Client: Geosyntec Consultants Inc
Project/Site: AEP Amos Power Plant - ASD

Job ID: 240-202469-1

## Client Sample ID: MW-1801-SS-59.8-60.5-20240403 — Lab Sample ID: 240-202469-1

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | 25600 | | 422 | 30.8 | mg/Kg | 1 | ☼ | 6010D | Total/NA |
| Cation Exchange Capacity | 2.46 | | 0.502 | 0.502 | meq/100gm | 1 | ☼ | 9081 | Total/NA |
| Chloride | 24.8 | | 10.2 | 2.04 | mg/Kg | 1 | ☼ | 9056A | Soluble |
| Fluoride | 0.793 | | 0.512 | 0.342 | mg/Kg | 1 | ☼ | 9056A | Soluble |
| Sulfate | 20.0 | | 10.2 | 3.98 | mg/Kg | 1 | ☼ | 9056A | Soluble |
| PSR sample generated | DONE | | | | NONE | 1 | | Part Size Red | Total/NA |

## Client Sample ID: MW-1802-SS-56.3-56.9-20240403 — Lab Sample ID: 240-202469-2

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | 3400 | | 480 | 35.0 | mg/Kg | 1 | ☼ | 6010D | Total/NA |
| Cation Exchange Capacity | 4.25 | | 0.504 | 0.504 | meq/100gm | 1 | ☼ | 9081 | Total/NA |
| Fluoride | 0.790 | | 0.494 | 0.330 | mg/Kg | 1 | ☼ | 9056A | Soluble |
| Sulfate | 8.45 | J | 9.87 | 3.84 | mg/Kg | 1 | ☼ | 9056A | Soluble |
| PSR sample generated | DONE | | | | NONE | 1 | | Part Size Red | Total/NA |

## Client Sample ID: MW-1801-SH-55.9-56.6-20240403 — Lab Sample ID: 240-202469-3

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | 1010 | | 423 | 30.8 | mg/Kg | 1 | ☼ | 6010D | Total/NA |
| Cation Exchange Capacity | 18.0 | | 0.512 | 0.512 | meq/100gm | 1 | ☼ | 9081 | Total/NA |
| Fluoride | 3.28 | | 0.521 | 0.348 | mg/Kg | 1 | ☼ | 9056A | Soluble |
| Sulfate | 9.59 | J | 10.4 | 4.05 | mg/Kg | 1 | ☼ | 9056A | Soluble |
| PSR sample generated | DONE | | | | NONE | 1 | | Part Size Red | Total/NA |

## Client Sample ID: MW-1801-SH-58.0-58.8-20240403 — Lab Sample ID: 240-202469-4

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | 2910 | | 470 | 34.3 | mg/Kg | 1 | ☼ | 6010D | Total/NA |
| Cation Exchange Capacity | 18.8 | | 0.512 | 0.512 | meq/100gm | 1 | ☼ | 9081 | Total/NA |
| Fluoride | 3.43 | | 0.523 | 0.349 | mg/Kg | 1 | ☼ | 9056A | Soluble |
| Sulfate | 16.6 | | 10.5 | 4.07 | mg/Kg | 1 | ☼ | 9056A | Soluble |
| PSR sample generated | DONE | | | | NONE | 1 | | Part Size Red | Total/NA |

## Client Sample ID: MW-1802-SH-51.9-52.5-20240403 — Lab Sample ID: 240-202469-5

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | 1120 | | 408 | 29.7 | mg/Kg | 1 | ☼ | 6010D | Total/NA |
| Cation Exchange Capacity | 35.7 | | 0.514 | 0.514 | meq/100gm | 1 | ☼ | 9081 | Total/NA |
| Fluoride | 4.61 | | 0.524 | 0.350 | mg/Kg | 1 | ☼ | 9056A | Soluble |
| Sulfate | 17.9 | | 10.5 | 4.08 | mg/Kg | 1 | ☼ | 9056A | Soluble |
| PSR sample generated | DONE | | | | NONE | 1 | | Part Size Red | Total/NA |

## Client Sample ID: MW-1802-SH-55.3-55.8-20240403 — Lab Sample ID: 240-202469-6

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | 1230 | | 357 | 26.0 | mg/Kg | 1 | ☼ | 6010D | Total/NA |
| Cation Exchange Capacity | 14.5 | | 0.511 | 0.511 | meq/100gm | 1 | ☼ | 9081 | Total/NA |
| Fluoride | 3.55 | | 0.518 | 0.346 | mg/Kg | 1 | ☼ | 9056A | Soluble |
| Sulfate | 14.6 | | 10.4 | 4.03 | mg/Kg | 1 | ☼ | 9056A | Soluble |
| PSR sample generated | DONE | | | | NONE | 1 | | Part Size Red | Total/NA |

This Detection Summary does not include radiochemical test results.

# Client Sample Results

Client: Geosyntec Consultants Inc
Project/Site: AEP Amos Power Plant - ASD

Job ID: 240-202469-1

## Client Sample ID: MW-1801-SS-59.8-60.5-20240403

**Lab Sample ID: 240-202469-1**

**Date Collected: 04/03/24 11:00**
**Matrix: Solid**
**Date Received: 04/08/24 12:30**
**Percent Solids: 99.5**

### Method: SW846 6010D - Metals (ICP)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | 25600 | | 422 | 30.8 | mg/Kg | ☼ | 04/09/24 15:00 | 04/10/24 15:12 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Cation Exchange Capacity (SW846 9081) | 2.46 | | 0.502 | 0.502 | meq/100gm | ☼ | 04/28/24 12:55 | 05/01/24 09:35 | 1 |
| Percent Solids (EPA Moisture) | 99.5 | | 0.1 | 0.1 | % | | | 04/10/24 17:00 | 1 |
| Percent Moisture (EPA Moisture) | 0.5 | | 0.1 | 0.1 | % | | | 04/10/24 17:00 | 1 |

### General Chemistry - Soluble

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Chloride (SW846 9056A) | 24.8 | | 10.2 | 2.04 | mg/Kg | ☼ | | 04/17/24 08:29 | 1 |
| Fluoride (SW846 9056A) | 0.793 | | 0.512 | 0.342 | mg/Kg | ☼ | | 04/17/24 08:29 | 1 |
| Sulfate (SW846 9056A) | 20.0 | | 10.2 | 3.98 | mg/Kg | ☼ | | 04/17/24 08:29 | 1 |

### Method: Part Size Red - Particle Size Reduction Preparation

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PSR sample generated | DONE | | | | NONE | | | 04/09/24 12:36 | 1 |

Client: Geosyntec Consultants Inc
Project/Site: AEP Amos Power Plant - ASD

Job ID: 240-202469-1

**Client Sample ID: MW-1802-SS-56.3-56.9-20240403**
**Date Collected: 04/03/24 11:05**
**Date Received: 04/08/24 12:30**

**Lab Sample ID: 240-202469-2**
**Matrix: Solid**
**Percent Solids: 99.3**

### Method: SW846 6010D - Metals (ICP)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | 3400 | | 480 | 35.0 | mg/Kg | ☼ | 04/09/24 15:00 | 04/10/24 15:42 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Cation Exchange Capacity (SW846 9081) | 4.25 | | 0.504 | 0.504 | meq/100gm | ☼ | 04/28/24 12:55 | 05/01/24 09:35 | 1 |
| Percent Solids (EPA Moisture) | 99.3 | | 0.1 | 0.1 | % | | | 04/10/24 17:00 | 1 |
| Percent Moisture (EPA Moisture) | 0.7 | | 0.1 | 0.1 | % | | | 04/10/24 17:00 | 1 |

### General Chemistry - Soluble

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Chloride (SW846 9056A) | ND | | 9.87 | 1.97 | mg/Kg | ☼ | | 04/17/24 09:34 | 1 |
| Fluoride (SW846 9056A) | 0.790 | | 0.494 | 0.330 | mg/Kg | ☼ | | 04/17/24 09:34 | 1 |
| Sulfate (SW846 9056A) | 8.45 | J | 9.87 | 3.84 | mg/Kg | ☼ | | 04/17/24 09:34 | 1 |

### Method: Part Size Red - Particle Size Reduction Preparation

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PSR sample generated | DONE | | | | NONE | | | 04/09/24 12:36 | 1 |

Client: Geosyntec Consultants Inc
Project/Site: AEP Amos Power Plant - ASD

Job ID: 240-202469-1

**Client Sample ID: MW-1801-SH-55.9-56.6-20240403**
**Date Collected: 04/03/24 11:10**
**Date Received: 04/08/24 12:30**

**Lab Sample ID: 240-202469-3**
**Matrix: Solid**
**Percent Solids: 97.7**

### Method: SW846 6010D - Metals (ICP)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | 1010 | | 423 | 30.8 | mg/Kg | ☼ | 04/09/24 15:00 | 04/10/24 15:46 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Cation Exchange Capacity (SW846 9081) | 18.0 | | 0.512 | 0.512 | meq/100gm | ☼ | 04/28/24 12:55 | 05/01/24 09:35 | 1 |
| Percent Solids (EPA Moisture) | 97.7 | | 0.1 | 0.1 | % | | | 04/10/24 17:00 | 1 |
| Percent Moisture (EPA Moisture) | 2.3 | | 0.1 | 0.1 | % | | | 04/10/24 17:00 | 1 |

### General Chemistry - Soluble

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Chloride (SW846 9056A) | ND | | 10.4 | 2.08 | mg/Kg | ☼ | | 04/17/24 09:56 | 1 |
| Fluoride (SW846 9056A) | 3.28 | | 0.521 | 0.348 | mg/Kg | ☼ | | 04/17/24 09:56 | 1 |
| Sulfate (SW846 9056A) | 9.59 | J | 10.4 | 4.05 | mg/Kg | ☼ | | 04/17/24 09:56 | 1 |

### Method: Part Size Red - Particle Size Reduction Preparation

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PSR sample generated | DONE | | | | NONE | | | 04/09/24 12:36 | 1 |

# Client Sample Results

Client: Geosyntec Consultants Inc
Project/Site: AEP Amos Power Plant - ASD

Job ID: 240-202469-1

## Client Sample ID: MW-1801-SH-58.0-58.8-20240403

**Lab Sample ID: 240-202469-4**

**Date Collected: 04/03/24 11:15**
**Matrix: Solid**
**Date Received: 04/08/24 12:30**
**Percent Solids: 97.6**

### Method: SW846 6010D - Metals (ICP)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | 2910 | | 470 | 34.3 | mg/Kg | ☼ | 04/09/24 15:00 | 04/10/24 15:51 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Cation Exchange Capacity (SW846 9081) | 18.8 | | 0.512 | 0.512 | meq/100gm | ☼ | 04/28/24 12:55 | 05/01/24 09:35 | 1 |
| Percent Solids (EPA Moisture) | 97.6 | | 0.1 | 0.1 | % | | | 04/10/24 17:00 | 1 |
| Percent Moisture (EPA Moisture) | 2.4 | | 0.1 | 0.1 | % | | | 04/10/24 17:00 | 1 |

### General Chemistry - Soluble

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Chloride (SW846 9056A) | ND | | 10.5 | 2.09 | mg/Kg | ☼ | | 04/17/24 10:18 | 1 |
| Fluoride (SW846 9056A) | 3.43 | | 0.523 | 0.349 | mg/Kg | ☼ | | 04/17/24 10:18 | 1 |
| Sulfate (SW846 9056A) | 16.6 | | 10.5 | 4.07 | mg/Kg | ☼ | | 04/17/24 10:18 | 1 |

### Method: Part Size Red - Particle Size Reduction Preparation

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PSR sample generated | DONE | | | | NONE | | | 04/09/24 12:36 | 1 |

# Client Sample Results

Client: Geosyntec Consultants Inc
Project/Site: AEP Amos Power Plant - ASD

Job ID: 240-202469-1

## Client Sample ID: MW-1802-SH-51.9-52.5-20240403

**Lab Sample ID: 240-202469-5**

**Date Collected: 04/03/24 11:20**
**Matrix: Solid**
**Date Received: 04/08/24 12:30**
**Percent Solids: 97.3**

### Method: SW846 6010D - Metals (ICP)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | 1120 | | 408 | 29.7 | mg/Kg | ☼ | 04/09/24 15:00 | 04/10/24 15:55 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Cation Exchange Capacity (SW846 9081) | 35.7 | | 0.514 | 0.514 | meq/100gm | ☼ | 04/28/24 12:55 | 05/01/24 09:35 | 1 |
| Percent Solids (EPA Moisture) | 97.3 | | 0.1 | 0.1 | % | | | 04/10/24 17:00 | 1 |
| Percent Moisture (EPA Moisture) | 2.7 | | 0.1 | 0.1 | % | | | 04/10/24 17:00 | 1 |

### General Chemistry - Soluble

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Chloride (SW846 9056A) | ND | | 10.5 | 2.09 | mg/Kg | ☼ | | 04/17/24 12:33 | 1 |
| Fluoride (SW846 9056A) | 4.61 | | 0.524 | 0.350 | mg/Kg | ☼ | | 04/17/24 12:33 | 1 |
| Sulfate (SW846 9056A) | 17.9 | | 10.5 | 4.08 | mg/Kg | ☼ | | 04/17/24 12:33 | 1 |

### Method: Part Size Red - Particle Size Reduction Preparation

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PSR sample generated | DONE | | | | NONE | | | 04/09/24 12:36 | 1 |

Client: Geosyntec Consultants Inc
Project/Site: AEP Amos Power Plant - ASD

Job ID: 240-202469-1

**Client Sample ID: MW-1802-SH-55.3-55.8-20240403**
**Date Collected: 04/03/24 11:25**
**Date Received: 04/08/24 12:30**

**Lab Sample ID: 240-202469-6**
**Matrix: Solid**
**Percent Solids: 97.9**

### Method: SW846 6010D - Metals (ICP)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | 1230 | | 357 | 26.0 | mg/Kg | ☼ | 04/09/24 15:00 | 04/10/24 16:00 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Cation Exchange Capacity (SW846 9081) | 14.5 | | 0.511 | 0.511 | meq/100gm | ☼ | 04/28/24 12:55 | 05/01/24 09:35 | 1 |
| Percent Solids (EPA Moisture) | 97.9 | | 0.1 | 0.1 | % | | | 04/10/24 17:00 | 1 |
| Percent Moisture (EPA Moisture) | 2.1 | | 0.1 | 0.1 | % | | | 04/10/24 17:00 | 1 |

### General Chemistry - Soluble

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Chloride (SW846 9056A) | ND | | 10.4 | 2.06 | mg/Kg | ☼ | | 04/17/24 12:54 | 1 |
| Fluoride (SW846 9056A) | 3.55 | | 0.518 | 0.346 | mg/Kg | ☼ | | 04/17/24 12:54 | 1 |
| Sulfate (SW846 9056A) | 14.6 | | 10.4 | 4.03 | mg/Kg | ☼ | | 04/17/24 12:54 | 1 |

### Method: Part Size Red - Particle Size Reduction Preparation

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PSR sample generated | DONE | | | | NONE | | | 04/09/24 12:36 | 1 |

## Method: 6010D - Metals (ICP)

**Lab Sample ID: MB 240-608971/1-A**
**Matrix: Solid**
**Analysis Batch: 609193**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 608971**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | ND | | 500 | 36.5 | mg/Kg | | 04/09/24 15:00 | 04/10/24 15:03 | 1 |

**Lab Sample ID: LCS 240-608971/2-A**
**Matrix: Solid**
**Analysis Batch: 609193**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 608971**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Calcium | 5000 | 4663 | | mg/Kg | | 93 | 80 - 120 |
| Sodium | 5000 | 4870 | | mg/Kg | | 97 | 80 - 120 |

**Lab Sample ID: 240-202469-1 MS**
**Matrix: Solid**
**Analysis Batch: 609193**

**Client Sample ID: MW-1801-SS-59.8-60.5-20240403**
**Prep Type: Total/NA**
**Prep Batch: 608971**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | 25600 | | 4330 | 29520 | 4 | mg/Kg | ☼ | 89 | 75 - 125 |
| Sodium | ND | | 4330 | 3941 | | mg/Kg | ☼ | 91 | 75 - 125 |

**Lab Sample ID: 240-202469-1 MSD**
**Matrix: Solid**
**Analysis Batch: 609193**

**Client Sample ID: MW-1801-SS-59.8-60.5-20240403**
**Prep Type: Total/NA**
**Prep Batch: 608971**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcium | 25600 | | 4330 | 30400 | 4 | mg/Kg | ☼ | 110 | 75 - 125 | 3 | 20 |
| Sodium | ND | | 4330 | 3943 | | mg/Kg | ☼ | 91 | 75 - 125 | 0 | 20 |

## Method: 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 240-609689/1-A**
**Matrix: Solid**
**Analysis Batch: 609809**

**Client Sample ID: Method Blank**
**Prep Type: Soluble**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Chloride | ND | | 9.95 | 1.98 | mg/Kg | | | 04/17/24 07:46 | 1 |
| Fluoride | ND | | 0.498 | 0.332 | mg/Kg | | | 04/17/24 07:46 | 1 |
| Sulfate | ND | | 9.95 | 3.87 | mg/Kg | | | 04/17/24 07:46 | 1 |

**Lab Sample ID: LCS 240-609689/2-A**
**Matrix: Solid**
**Analysis Batch: 609809**

**Client Sample ID: Lab Control Sample**
**Prep Type: Soluble**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Chloride | 500 | 504.8 | | mg/Kg | | 101 | 90 - 110 |
| Fluoride | 25.0 | 26.00 | | mg/Kg | | 104 | 90 - 110 |
| Sulfate | 500 | 519.2 | | mg/Kg | | 104 | 90 - 110 |

## Method: 9056A - Anions, Ion Chromatography (Continued)

**Lab Sample ID: 240-202469-1 MS**
**Matrix: Solid**
**Analysis Batch: 609809**

**Client Sample ID: MW-1801-SS-59.8-60.5-20240403**
**Prep Type: Soluble**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 24.8 | | 512 | 576.6 | | mg/Kg | ☼ | 108 | 80 - 120 | | |
| Fluoride | 0.793 | | 25.6 | 29.82 | | mg/Kg | ☼ | 113 | 80 - 120 | | |
| Sulfate | 20.0 | | 512 | 580.7 | | mg/Kg | ☼ | 110 | 80 - 120 | | |

**Lab Sample ID: 240-202469-1 MSD**
**Matrix: Solid**
**Analysis Batch: 609809**

**Client Sample ID: MW-1801-SS-59.8-60.5-20240403**
**Prep Type: Soluble**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 24.8 | | 512 | 580.0 | | mg/Kg | ☼ | 109 | 80 - 120 | 1 | 15 |
| Fluoride | 0.793 | | 25.6 | 30.05 | | mg/Kg | ☼ | 114 | 80 - 120 | 1 | 15 |
| Sulfate | 20.0 | | 512 | 583.9 | | mg/Kg | ☼ | 110 | 80 - 120 | 1 | 15 |

## Method: 9081 - Cation Exchange Capacity (CEC)

**Lab Sample ID: MB 860-157253/1-A**
**Matrix: Solid**
**Analysis Batch: 157810**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 157253**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Cation Exchange Capacity | ND | | 0.500 | 0.500 | meq/100gm | | 04/28/24 12:54 | 05/01/24 09:35 | 1 |

## Metals

### Prep Batch: 608971

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 240-202469-1 | MW-1801-SS-59.8-60.5-20240403 | Total/NA | Solid | 3050B | |
| 240-202469-2 | MW-1802-SS-56.3-56.9-20240403 | Total/NA | Solid | 3050B | |
| 240-202469-3 | MW-1801-SH-55.9-56.6-20240403 | Total/NA | Solid | 3050B | |
| 240-202469-4 | MW-1801-SH-58.0-58.8-20240403 | Total/NA | Solid | 3050B | |
| 240-202469-5 | MW-1802-SH-51.9-52.5-20240403 | Total/NA | Solid | 3050B | |
| 240-202469-6 | MW-1802-SH-55.3-55.8-20240403 | Total/NA | Solid | 3050B | |
| MB 240-608971/1-A | Method Blank | Total/NA | Solid | 3050B | |
| LCS 240-608971/2-A | Lab Control Sample | Total/NA | Solid | 3050B | |
| 240-202469-1 MS | MW-1801-SS-59.8-60.5-20240403 | Total/NA | Solid | 3050B | |
| 240-202469-1 MSD | MW-1801-SS-59.8-60.5-20240403 | Total/NA | Solid | 3050B | |

### Analysis Batch: 609193

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 240-202469-1 | MW-1801-SS-59.8-60.5-20240403 | Total/NA | Solid | 6010D | 608971 |
| 240-202469-2 | MW-1802-SS-56.3-56.9-20240403 | Total/NA | Solid | 6010D | 608971 |
| 240-202469-3 | MW-1801-SH-55.9-56.6-20240403 | Total/NA | Solid | 6010D | 608971 |
| 240-202469-4 | MW-1801-SH-58.0-58.8-20240403 | Total/NA | Solid | 6010D | 608971 |
| 240-202469-5 | MW-1802-SH-51.9-52.5-20240403 | Total/NA | Solid | 6010D | 608971 |
| 240-202469-6 | MW-1802-SH-55.3-55.8-20240403 | Total/NA | Solid | 6010D | 608971 |
| MB 240-608971/1-A | Method Blank | Total/NA | Solid | 6010D | 608971 |
| LCS 240-608971/2-A | Lab Control Sample | Total/NA | Solid | 6010D | 608971 |
| 240-202469-1 MS | MW-1801-SS-59.8-60.5-20240403 | Total/NA | Solid | 6010D | 608971 |
| 240-202469-1 MSD | MW-1801-SS-59.8-60.5-20240403 | Total/NA | Solid | 6010D | 608971 |

## General Chemistry

### Prep Batch: 157253

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 240-202469-1 | MW-1801-SS-59.8-60.5-20240403 | Total/NA | Solid | 9081 | |
| 240-202469-2 | MW-1802-SS-56.3-56.9-20240403 | Total/NA | Solid | 9081 | |
| 240-202469-3 | MW-1801-SH-55.9-56.6-20240403 | Total/NA | Solid | 9081 | |
| 240-202469-4 | MW-1801-SH-58.0-58.8-20240403 | Total/NA | Solid | 9081 | |
| 240-202469-5 | MW-1802-SH-51.9-52.5-20240403 | Total/NA | Solid | 9081 | |
| 240-202469-6 | MW-1802-SH-55.3-55.8-20240403 | Total/NA | Solid | 9081 | |
| MB 860-157253/1-A | Method Blank | Total/NA | Solid | 9081 | |

### Analysis Batch: 157810

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 240-202469-1 | MW-1801-SS-59.8-60.5-20240403 | Total/NA | Solid | 9081 | 157253 |
| 240-202469-2 | MW-1802-SS-56.3-56.9-20240403 | Total/NA | Solid | 9081 | 157253 |
| 240-202469-3 | MW-1801-SH-55.9-56.6-20240403 | Total/NA | Solid | 9081 | 157253 |
| 240-202469-4 | MW-1801-SH-58.0-58.8-20240403 | Total/NA | Solid | 9081 | 157253 |
| 240-202469-5 | MW-1802-SH-51.9-52.5-20240403 | Total/NA | Solid | 9081 | 157253 |
| 240-202469-6 | MW-1802-SH-55.3-55.8-20240403 | Total/NA | Solid | 9081 | 157253 |
| MB 860-157253/1-A | Method Blank | Total/NA | Solid | 9081 | 157253 |

### Analysis Batch: 609179

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 240-202469-1 | MW-1801-SS-59.8-60.5-20240403 | Total/NA | Solid | Moisture | |
| 240-202469-2 | MW-1802-SS-56.3-56.9-20240403 | Total/NA | Solid | Moisture | |
| 240-202469-3 | MW-1801-SH-55.9-56.6-20240403 | Total/NA | Solid | Moisture | |

## General Chemistry (Continued)

### Analysis Batch: 609179 (Continued)

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 240-202469-4 | MW-1801-SH-58.0-58.8-20240403 | Total/NA | Solid | Moisture | |
| 240-202469-5 | MW-1802-SH-51.9-52.5-20240403 | Total/NA | Solid | Moisture | |
| 240-202469-6 | MW-1802-SH-55.3-55.8-20240403 | Total/NA | Solid | Moisture | |

### Leach Batch: 609689

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 240-202469-1 | MW-1801-SS-59.8-60.5-20240403 | Soluble | Solid | DI Leach | |
| 240-202469-2 | MW-1802-SS-56.3-56.9-20240403 | Soluble | Solid | DI Leach | |
| 240-202469-3 | MW-1801-SH-55.9-56.6-20240403 | Soluble | Solid | DI Leach | |
| 240-202469-4 | MW-1801-SH-58.0-58.8-20240403 | Soluble | Solid | DI Leach | |
| 240-202469-5 | MW-1802-SH-51.9-52.5-20240403 | Soluble | Solid | DI Leach | |
| 240-202469-6 | MW-1802-SH-55.3-55.8-20240403 | Soluble | Solid | DI Leach | |
| MB 240-609689/1-A | Method Blank | Soluble | Solid | DI Leach | |
| LCS 240-609689/2-A | Lab Control Sample | Soluble | Solid | DI Leach | |
| 240-202469-1 MS | MW-1801-SS-59.8-60.5-20240403 | Soluble | Solid | DI Leach | |
| 240-202469-1 MSD | MW-1801-SS-59.8-60.5-20240403 | Soluble | Solid | DI Leach | |

### Analysis Batch: 609809

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 240-202469-1 | MW-1801-SS-59.8-60.5-20240403 | Soluble | Solid | 9056A | 609689 |
| 240-202469-2 | MW-1802-SS-56.3-56.9-20240403 | Soluble | Solid | 9056A | 609689 |
| 240-202469-3 | MW-1801-SH-55.9-56.6-20240403 | Soluble | Solid | 9056A | 609689 |
| 240-202469-4 | MW-1801-SH-58.0-58.8-20240403 | Soluble | Solid | 9056A | 609689 |
| 240-202469-5 | MW-1802-SH-51.9-52.5-20240403 | Soluble | Solid | 9056A | 609689 |
| 240-202469-6 | MW-1802-SH-55.3-55.8-20240403 | Soluble | Solid | 9056A | 609689 |
| MB 240-609689/1-A | Method Blank | Soluble | Solid | 9056A | 609689 |
| LCS 240-609689/2-A | Lab Control Sample | Soluble | Solid | 9056A | 609689 |
| 240-202469-1 MS | MW-1801-SS-59.8-60.5-20240403 | Soluble | Solid | 9056A | 609689 |
| 240-202469-1 MSD | MW-1801-SS-59.8-60.5-20240403 | Soluble | Solid | 9056A | 609689 |

## Organic Prep

### Analysis Batch: 608940

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 240-202469-1 | MW-1801-SS-59.8-60.5-20240403 | Total/NA | Solid | Part Size Red | |
| 240-202469-2 | MW-1802-SS-56.3-56.9-20240403 | Total/NA | Solid | Part Size Red | |
| 240-202469-3 | MW-1801-SH-55.9-56.6-20240403 | Total/NA | Solid | Part Size Red | |
| 240-202469-4 | MW-1801-SH-58.0-58.8-20240403 | Total/NA | Solid | Part Size Red | |
| 240-202469-5 | MW-1802-SH-51.9-52.5-20240403 | Total/NA | Solid | Part Size Red | |
| 240-202469-6 | MW-1802-SH-55.3-55.8-20240403 | Total/NA | Solid | Part Size Red | |

# Lab Chronicle

Client: Geosyntec Consultants Inc
Project/Site: AEP Amos Power Plant - ASD

Job ID: 240-202469-1

## Client Sample ID: MW-1801-SS-59.8-60.5-20240403
**Lab Sample ID: 240-202469-1**

**Date Collected: 04/03/24 11:00**
**Matrix: Solid**
**Date Received: 04/08/24 12:30**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | Moisture | | 1 | 609179 | QUY8 | EET CLE | 04/10/24 17:00 |
| Total/NA | Analysis | Part Size Red | | 1 | 608940 | POP | EET CLE | 04/09/24 12:36 |

## Client Sample ID: MW-1801-SS-59.8-60.5-20240403
**Lab Sample ID: 240-202469-1**

**Date Collected: 04/03/24 11:00**
**Matrix: Solid**
**Date Received: 04/08/24 12:30**
**Percent Solids: 99.5**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3050B | | | 608971 | DEE | EET CLE | 04/09/24 15:00 |
| Total/NA | Analysis | 6010D | | 1 | 609193 | KLC | EET CLE | 04/10/24 15:12 |
| Soluble | Leach | DI Leach | | | 609689 | JWW | EET CLE | 04/15/24 16:00 |
| Soluble | Analysis | 9056A | | 1 | 609809 | JWW | EET CLE | 04/17/24 08:29 |
| Total/NA | Prep | 9081 | | | 157253 | PB | EET HOU | 04/28/24 12:55 |
| Total/NA | Analysis | 9081 | | 1 | 157810 | JDM | EET HOU | 05/01/24 09:35 |

## Client Sample ID: MW-1802-SS-56.3-56.9-20240403
**Lab Sample ID: 240-202469-2**

**Date Collected: 04/03/24 11:05**
**Matrix: Solid**
**Date Received: 04/08/24 12:30**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | Moisture | | 1 | 609179 | QUY8 | EET CLE | 04/10/24 17:00 |
| Total/NA | Analysis | Part Size Red | | 1 | 608940 | POP | EET CLE | 04/09/24 12:36 |

## Client Sample ID: MW-1802-SS-56.3-56.9-20240403
**Lab Sample ID: 240-202469-2**

**Date Collected: 04/03/24 11:05**
**Matrix: Solid**
**Date Received: 04/08/24 12:30**
**Percent Solids: 99.3**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3050B | | | 608971 | DEE | EET CLE | 04/09/24 15:00 |
| Total/NA | Analysis | 6010D | | 1 | 609193 | KLC | EET CLE | 04/10/24 15:42 |
| Soluble | Leach | DI Leach | | | 609689 | JWW | EET CLE | 04/15/24 16:00 |
| Soluble | Analysis | 9056A | | 1 | 609809 | JWW | EET CLE | 04/17/24 09:34 |
| Total/NA | Prep | 9081 | | | 157253 | PB | EET HOU | 04/28/24 12:55 |
| Total/NA | Analysis | 9081 | | 1 | 157810 | JDM | EET HOU | 05/01/24 09:35 |

## Client Sample ID: MW-1801-SH-55.9-56.6-20240403
**Lab Sample ID: 240-202469-3**

**Date Collected: 04/03/24 11:10**
**Matrix: Solid**
**Date Received: 04/08/24 12:30**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | Moisture | | 1 | 609179 | QUY8 | EET CLE | 04/10/24 17:00 |
| Total/NA | Analysis | Part Size Red | | 1 | 608940 | POP | EET CLE | 04/09/24 12:36 |

# Lab Chronicle

Client: Geosyntec Consultants Inc
Project/Site: AEP Amos Power Plant - ASD

Job ID: 240-202469-1

## Client Sample ID: MW-1801-SH-55.9-56.6-20240403
## Lab Sample ID: 240-202469-3

**Date Collected: 04/03/24 11:10**
**Matrix: Solid**
**Date Received: 04/08/24 12:30**
**Percent Solids: 97.7**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3050B | | | 608971 | DEE | EET CLE | 04/09/24 15:00 |
| Total/NA | Analysis | 6010D | | 1 | 609193 | KLC | EET CLE | 04/10/24 15:46 |
| Soluble | Leach | DI Leach | | | 609689 | JWW | EET CLE | 04/15/24 16:00 |
| Soluble | Analysis | 9056A | | 1 | 609809 | JWW | EET CLE | 04/17/24 09:56 |
| Total/NA | Prep | 9081 | | | 157253 | PB | EET HOU | 04/28/24 12:55 |
| Total/NA | Analysis | 9081 | | 1 | 157810 | JDM | EET HOU | 05/01/24 09:35 |

## Client Sample ID: MW-1801-SH-58.0-58.8-20240403
## Lab Sample ID: 240-202469-4

**Date Collected: 04/03/24 11:15**
**Matrix: Solid**
**Date Received: 04/08/24 12:30**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | Moisture | | 1 | 609179 | QUY8 | EET CLE | 04/10/24 17:00 |
| Total/NA | Analysis | Part Size Red | | 1 | 608940 | POP | EET CLE | 04/09/24 12:36 |

## Client Sample ID: MW-1801-SH-58.0-58.8-20240403
## Lab Sample ID: 240-202469-4

**Date Collected: 04/03/24 11:15**
**Matrix: Solid**
**Date Received: 04/08/24 12:30**
**Percent Solids: 97.6**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3050B | | | 608971 | DEE | EET CLE | 04/09/24 15:00 |
| Total/NA | Analysis | 6010D | | 1 | 609193 | KLC | EET CLE | 04/10/24 15:51 |
| Soluble | Leach | DI Leach | | | 609689 | JWW | EET CLE | 04/15/24 16:00 |
| Soluble | Analysis | 9056A | | 1 | 609809 | JWW | EET CLE | 04/17/24 10:18 |
| Total/NA | Prep | 9081 | | | 157253 | PB | EET HOU | 04/28/24 12:55 |
| Total/NA | Analysis | 9081 | | 1 | 157810 | JDM | EET HOU | 05/01/24 09:35 |

## Client Sample ID: MW-1802-SH-51.9-52.5-20240403
## Lab Sample ID: 240-202469-5

**Date Collected: 04/03/24 11:20**
**Matrix: Solid**
**Date Received: 04/08/24 12:30**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | Moisture | | 1 | 609179 | QUY8 | EET CLE | 04/10/24 17:00 |
| Total/NA | Analysis | Part Size Red | | 1 | 608940 | POP | EET CLE | 04/09/24 12:36 |

## Client Sample ID: MW-1802-SH-51.9-52.5-20240403
## Lab Sample ID: 240-202469-5

**Date Collected: 04/03/24 11:20**
**Matrix: Solid**
**Date Received: 04/08/24 12:30**
**Percent Solids: 97.3**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3050B | | | 608971 | DEE | EET CLE | 04/09/24 15:00 |
| Total/NA | Analysis | 6010D | | 1 | 609193 | KLC | EET CLE | 04/10/24 15:55 |
| Soluble | Leach | DI Leach | | | 609689 | JWW | EET CLE | 04/15/24 16:00 |
| Soluble | Analysis | 9056A | | 1 | 609809 | JWW | EET CLE | 04/17/24 12:33 |

# Lab Chronicle

Client: Geosyntec Consultants Inc
Project/Site: AEP Amos Power Plant - ASD

Job ID: 240-202469-1

## Client Sample ID: MW-1802-SH-51.9-52.5-20240403
**Lab Sample ID: 240-202469-5**

**Date Collected: 04/03/24 11:20**
**Matrix: Solid**
**Date Received: 04/08/24 12:30**
**Percent Solids: 97.3**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 9081 | | | 157253 | PB | EET HOU | 04/28/24 12:55 |
| Total/NA | Analysis | 9081 | | 1 | 157810 | JDM | EET HOU | 05/01/24 09:35 |

## Client Sample ID: MW-1802-SH-55.3-55.8-20240403
**Lab Sample ID: 240-202469-6**

**Date Collected: 04/03/24 11:25**
**Matrix: Solid**
**Date Received: 04/08/24 12:30**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | Moisture | | 1 | 609179 | QUY8 | EET CLE | 04/10/24 17:00 |
| Total/NA | Analysis | Part Size Red | | 1 | 608940 | POP | EET CLE | 04/09/24 12:36 |

## Client Sample ID: MW-1802-SH-55.3-55.8-20240403
**Lab Sample ID: 240-202469-6**

**Date Collected: 04/03/24 11:25**
**Matrix: Solid**
**Date Received: 04/08/24 12:30**
**Percent Solids: 97.9**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3050B | | | 608971 | DEE | EET CLE | 04/09/24 15:00 |
| Total/NA | Analysis | 6010D | | 1 | 609193 | KLC | EET CLE | 04/10/24 16:00 |
| Soluble | Leach | DI Leach | | | 609689 | JWW | EET CLE | 04/15/24 16:00 |
| Soluble | Analysis | 9056A | | 1 | 609809 | JWW | EET CLE | 04/17/24 12:54 |
| Total/NA | Prep | 9081 | | | 157253 | PB | EET HOU | 04/28/24 12:55 |
| Total/NA | Analysis | 9081 | | 1 | 157810 | JDM | EET HOU | 05/01/24 09:35 |

**Laboratory References:**

EET CLE = Eurofins Cleveland, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

EET HOU = Eurofins Houston, 4145 Greenbriar Dr, Stafford, TX 77477, TEL (281)240-4200

# Accreditation/Certification Summary

Client: Geosyntec Consultants Inc
Job ID: 240-202469-1
Project/Site: AEP Amos Power Plant - ASD

## Laboratory: Eurofins Cleveland

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

| Authority | Program | Identification Number | Expiration Date |
|---|---|---|---|
| California | State | 2927 | 02-28-25 |
| Georgia | State | 4062 | 02-27-25 |
| Illinois | NELAP | 200004 | 07-31-24 |
| Iowa | State | 421 | 06-01-25 |
| Kentucky (WW) | State | KY98016 | 12-30-24 |
| Minnesota | NELAP | 039-999-348 | 12-31-24 |
| New Jersey | NELAP | OH001 | 06-30-24 |
| New York | NELAP | 10975 | 04-02-25 |
| Ohio VAP | State | ORELAP 4062 | 02-27-25 |
| Oregon | NELAP | 4062 | 02-27-25 |
| Pennsylvania | NELAP | 68-00340 | 08-31-24 |
| Texas | NELAP | T104704517-22-19 | 08-31-24 |
| USDA | US Federal Programs | P330-18-00281 | 01-05-27 |
| Virginia | NELAP | 460175 | 09-14-24 |
| West Virginia DEP | State | 210 | 12-31-24 |

## Laboratory: Eurofins Houston

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

| Authority | Program | Identification Number | Expiration Date |
|---|---|---|---|
| Arkansas DEQ | State | 88-00759 | 08-03-24 |
| Florida | NELAP | E871002 | 06-30-24 |
| Louisiana (All) | NELAP | 03054 | 06-30-24 |
| Oklahoma | NELAP | 1306 | 08-31-24 |
| Oklahoma | State | 2023-139 | 08-31-24 |
| Texas | NELAP | T104704215 | 06-30-24 |
| Texas | TCEQ Water Supply | T104704215 | 12-28-25 |
| USDA | US Federal Programs | 525-23-79-79507 | 03-20-26 |

**Eurofins Canton**
180 S. Van Buren Ave

Barberton, OH 44203-3543
phone 330.497.9396 fax 330.497.0772

# Chain of Custody Record

24.0 | 24.3

eurofins | Environment Testing America

**Regulatory Program:** ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

**Eurofins Environment Testing America**

| Client Contact | Project Manager: Allison Krenzberg | Site Contact: | Date: | COC No: |
|---|---|---|---|---|
| Your Company Name here: GeoSyntec Consultants | Email: akrenberg@geosyntec.com | Lab Contact: | Carrier: | 1 of 1 COCs |
| Address: 500 W Wilson Bridge Rd Ste 250 | Tel/Fax: 216 544 5007 | | | TALS Project #: |
| City/State/Zip: Worthington, OH 43085 | **Analysis Turnaround Time** | | | Sampler: |
| (xxx) xxx-xxxx Phone | ☒ CALENDAR DAYS ☐ WORKING DAYS | | | **For Lab Use Only:** |
| (xxx) xxx-xxxx FAX | TAT if different from Below _____ | | | Walk-in Client: |
| Project Name: Amos Landfill ASD | ☒ 2 weeks | | | Lab Sampling: |
| Site: Amos | ☐ 1 week | | | Job / SDG No.: |
| P O # | ☐ 2 days ☐ 1 day | | | |

| Sample Identification | Sample Date | Sample Time | Sample Type (C=Comp, G=Grab) | Matrix | # of Cont. | Filtered Sample (Y/N) | Perform MS / MSD (Y/N) | 9056A | 6010D | 29B_CEC | Sample Specific Notes: |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-1801-SS-59.8-60.5-20240403 | 4/3/24 | 1100 | G | Solid | 1 | | | X | X | X | |
| MW-1802-SS-56.3-56.9-20240403 | | 1105 | G | Solid | 1 | | | X | X | X | |
| MW-1801-SH-55.9-56.6-20240403 | | 1110 | G | Solid | 1 | | | X | X | X | |
| MW-1801-SH-58.0-58.8-20240403 | | 1115 | G | Solid | 1 | | | X | X | X | |
| MW-1802-SH-51.9-52.5-20240403 | | 1120 | G | Solid | 1 | | | X | X | X | |
| MW-1802-SH-55.3-55.8-20240403 | ↓ | 1125 | G | Solid | 1 | | | X | X | X | |

240-202469 Chain of Custody

**Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other** _____

**Possible Hazard Identification:**
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

**Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)**

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

**Special Instructions/QC Requirements & Comments:**

| Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____ |
|---|---|---|---|

| | Company | Date/Time | | Company | Date/Time |
|---|---|---|---|---|---|
| Relinquished by: Okiemute Commander | Geosyntec | 4/5/24 14:00 | Received by: Rochelle Harris | ECETNC | 4-8-24 1230 |
| Relinquished by: | Company: | Date/Time: | Received by: | Company: | Date/Time: |
| Relinquished by: | Company: | Date/Time: | Received in Laboratory by: | Company: | Date/Time: |

**Eurofins – Cleveland Sample Receipt Form/Narrative** **Login # :** _____
**Barberton Facility**

Client Geosyntec Site Name _____ Cooler unpacked by Rachelle Haidet

Cooler Received on 5 4 24 Opened on 5 4 24

FedEx: 1st (Grd) Exp UPS FAS Waypoint Client Drop Off Eurofins Courier Other _____

**Receipt After-hours** Drop-off Date/Time _____ Storage Location _____

Eurofins Cooler # _____ Foam Box Client Cooler (Box) Other _____

Packing material used Bubble Wrap Foam (Plastic Bag) None Other _____

COOLANT: Wet Ice Blue Ice Dry Ice Water (None)

1 Cooler temperature upon receipt ☐ See Multiple Cooler Form

IR GUN # 20 (CF +0.3 °C) Observed Cooler Temp. 24.0 °C Corrected Cooler Temp. 24.3 °C

| | | |
|---|---|---|
| 2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 | (Yes) | No |
| -Were the seals on the outside of the cooler(s) signed & dated? | (Yes) | No NA |
| -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? | Yes | (No) |
| -Were tamper/custody seals intact and uncompromised? | (Yes) | No NA |
| 3 Shippers' packing slip attached to the cooler(s)? | (Yes) | No |
| 4 Did custody papers accompany the sample(s)? | (Yes) | No |
| 5 Were the custody papers relinquished & signed in the appropriate place? | (Yes) | No |
| 6 Was/were the person(s) who collected the samples clearly identified on the COC? | Yes | (No) |
| 7 Did all bottles arrive in good condition (Unbroken)? | (Yes) | No |
| 8 Could all bottle labels (ID/Date/Time) be reconciled with the COC? | (Yes) | No |
| 9 For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N), and sample type of grab/comp (Y/N)? | | |
| 10 Were correct bottle(s) used for the test(s) indicated? | (Yes) | No |
| 11 Sufficient quantity received to perform indicated analyses? | (Yes) | No |
| 12 Are these work share samples and all listed on the COC? | Yes | (No) |
| If yes, Questions 13-17 have been checked at the originating laboratory | | |
| 13 Were all preserved sample(s) at the correct pH upon receipt? | Yes | No (NA) pH Strip Lot# HC329089 |
| 14 Were VOAs on the COC? | Yes | (No) |
| 15 Were air bubbles >6 mm in any VOA vials? ● ← Larger than this | Yes | No (NA) |
| 16 Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____ | Yes | (No) |
| 17 Was a LL Hg or Me Hg trip blank present? _____ | Yes | (No) |

**Tests that are not checked for pH by Receiving:**
**VOAs**
**Oil and Grease**
**TOC**

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

**18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES** ☐ additional next page

Samples processed by

_____

_____

_____

_____

**19 SAMPLE CONDITION**

Sample(s) _____ were received after the recommended holding time had expired

Sample(s) _____ were received in a broken container

Sample(s) _____ were received with bubble >6 mm in diameter (Notify PM)

**20 SAMPLE PRESERVATION**

Sample(s) _____ were further preserved in the laboratory

Time preserved _____ Preservative(s) added/Lot number(s) _____

VOA Sample Preservation Date/Time VOAs Frozen _____


FROM:
(309) 205-2434
Okiemute Commander
GEOSYNTEC CONSULTANTS
500 W Wilson Bridge Rd
Ste 250
WORTHINGTON OH 43085
US
SHIP DATE: 05APR24
ACTWGT: 3.35 LB
CAD: 6570118/ROSA2510
DIMMED: 12 X 11 X 11 IN
BILL 3rd PARTY
TO Eurofins Cleveland
180 S VAN BUREN AVE
BARBERTON OH 44203
(330) 497-9396
(US)
INV:
PO:
REF:
DEPT:
FedEx
Ground
TRK# 7758 4249 6140
9622 0417 3 (000 448 0300) 0 00 77
240-202469 Waybill
Custody
Okiemute

**Eurofins Cleveland**
180 S Van Buren Avenue
Barberton OH 44203
Phone: 330-497-9396 Fax: 330-497-0772

# Chain of Custody Record

eurofins | Environment Testing

| Client Information (Sub Contract Lab) | Sampler | Lab PM: Cisneros, Roxanne | Carrier Tracking No(s): | COC No: 240-182880.1 |
|---|---|---|---|---|
| Client Contact: Shipping/Receiving | Phone: | E-Mail: roxanne.cisneros@et.eurofinsus.com | State of Origin: Ohio | Page: Page 1 of 1 |
| Company: Eurofins Environment Testing South Centr | | Accreditations Required (See note): | | Job #: 240-202469-1 |
| Address: 4145 Greenbriar Dr | Due Date Requested: 4/22/2024 | | | |
| City: Stafford | TAT Requested (days): | | | |
| State, Zip: TX, 77477 | | | | |
| Phone: 281-240-4200(Tel) | PO #: | | | |
| Email: | WO #: | | | |
| Project Name: AEP Amos Power Plant ASD | Project #: 24033054 | | | |
| Site: | SSOW#: | | | |

**Analysis Requested**

Preservation Codes.

| | | | |
|---|---|---|---|
| A HCL | M Hexane | | |
| B NaOH | N None | | |
| C Zn Acetate | O AsNaO2 | | |
| D Nitric Acid | P Na2O4S | | |
| E NaHSO4 | Q Na2SO3 | | |
| F MeOH | R Na2S2O3 | | |
| G Amchlor | S H2SO4 | | |
| H Ascorbic Acid | T TSP Dodecahydrate | | |
| I Ice | U Acetone | | |
| J DI Water | V MCAA | | |
| K EDTA | W pH 4-5 | | |
| L EDA | Y Trizma | | |
| | Z other (specify) | | |

Other:

| Sample Identification Client ID (Lab ID) | Sample Date | Sample Time | Sample Type (C=Comp, G=grab) | Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air) | Field Filtered Sample (Yes or No) | Perform MS/MSD (Yes or No) | 299_CEC/299_Prep_Solid Cation Exchange Capacity(CEC) | Total Number of containers | Special Instructions/Note: |
|---|---|---|---|---|---|---|---|---|---|
| | | | Preservation Code: | | | | | | |
| MW-1801-SS-59.8-60.5-20240403 (240-202469-1) | 4/3/24 | 11:00 Eastern | | Solid | | | X | 1 | |
| MW-1802-SS-56.3-56.9-20240403 (240-202469-2) | 4/3/24 | 11:05 Eastern | | Solid | | | X | 1 | |
| MW-1801-SH-55.9-56.6-20240403 (240-202469-3) | 4/3/24 | 11:10 Eastern | | Solid | | | X | 1 | Hcl368 |
| MW-1801-SH-58.0-58.8-20240403 (240-202469-4) | 4/3/24 | 11:15 Eastern | | Solid | | | X | 1 | 2.6 |
| MW-1802-SH-51.9-52.5-20240403 (240-202469-5) | 4/3/24 | 11:20 Eastern | | Solid | | | X | 1 | 2.6 |
| MW-1802-SH-55.3-55.8-20240403 (240-202469-6) | 4/3/24 | 11:25 Eastern | | Solid | | | X | 1 | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

*Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC.*

| Possible Hazard Identification | Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) |
|---|---|
| Unconfirmed | ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months |
| Deliverable Requested: I II III, IV Other (specify) Primary Deliverable Rank: 2 | Special Instructions/QC Requirements: |

| | | | |
|---|---|---|---|
| Empty Kit Relinquished by: | Date: | Time: | Method of Shipment: |

| | | | | | |
|---|---|---|---|---|---|
| Relinquished by: Rachelle Nance | Date/Time: 4/9/24 1254 | Company: EESNC | Received by: | Date/Time: | Company |
| Relinquished by: | Date/Time: | Company | Received by: Jeremiah Baker | Date/Time: 4/10/2024 9 52 | Company EX |
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |

| Custody Seals Intact: Δ Yes Δ No | Custody Seal No. | Cooler Temperature(s) °C and Other Remarks: |
|---|---|---|

Ver: 06/08/2021

# Login Sample Receipt Checklist

Client: Geosyntec Consultants Inc

Job Number: 240-202469-1

**Login Number: 202469**
**List Number: 2**
**Creator: Baker, Jeremiah**

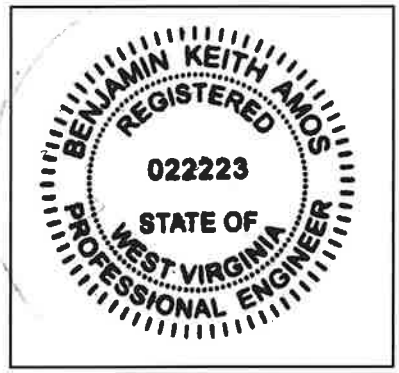
**List Source: Eurofins Houston**
**List Creation: 04/10/24 11:38 AM**

| Question | Answer | Comment |
|---|---|---|
| The cooler's custody seal, if present, is intact. | True | |
| Sample custody seals, if present, are intact. | True | |
| The cooler or samples do not appear to have been compromised or tampered with. | True | |
| Samples were received on ice. | True | |
| Cooler Temperature is acceptable. | True | |
| Cooler Temperature is recorded. | True | |
| COC is present. | True | |
| COC is filled out in ink and legible. | True | |
| COC is filled out with all pertinent information. | True | |
| Is the Field Sampler's name present on COC? | True | |
| There are no discrepancies between the containers received and the COC. | True | |
| Samples are received within Holding Time (excluding tests with immediate HTs) | True | |
| Sample containers have legible labels. | True | |
| Containers are not broken or leaking. | True | |
| Sample collection date/times are provided. | True | |
| Appropriate sample containers are used. | True | |
| Sample bottles are completely filled. | True | |
| Sample Preservation Verified. | True | |
| There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs | True | |
| Containers requiring zero headspace have no headspace or bubble is <6mm (1/4"). | True | |

# ATTACHMENT D
## 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 Amos Plant Landfill CCR management area and that the requirements of 40 CFR 257.94(e)(2) have been met.




Ben Amos
Printed Name of Licensed Professional Engineer

Ben Amos
Signature

| 022223 | West Virginia | 1/14/2025 |
|---|---|---|
| License Number | Licensing State | Date |

## APPENDIX 4

Not applicable.

## APPENDIX 5

Not applicable.